JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS

3rd Series No. 3] JANUARY 1946 [*Vol.* 53

CONTENTS

	PAGE
JOURNAL	65
SCHOOL PLANNING AND CONSTRUCTION, BY C. G. STILLMAN	67
THE PAINTING OF BUILDINGS, BY JAMES LAWRANCE	78
THE STRUCTURE OF SALISBURY CATHEDRAL TOWER AND SPIRE, BY W. A. FORSYTH	85
LONDON COUNTY COUNCIL HOUSING	88
PRACTICE NOTES	90
BOOK NOTES	91
ACCESSIONS TO THE LIBRARY	95
CORRESPONDENCE	99
OBITUARY	100
NOTES	100
MEMBERSHIP LISTS	100
COMPETITIONS	102
NOTICES	102
MEMBERS' COLUMN	103

MEETINGS AND LECTURES

INFORMAL GENERAL MEETING

12 February at 6 p.m. Professor J. D. Bernal, F.R.S., on :—

"SCIENCE IN ARCHITECTURE"

Professor Bernal is Chairman of the Scientific Advisory Committee of the Ministry of Works. He has been University Professor of Physics, Birkbeck College, London, since 1938 and is a writer on scientific, philosophical and social subjects. During the war he was Scientific Adviser to Combined Operations and to the Ministry of Home Security Research and Experiments Department.

ARCHITECTURAL SCIENCE BOARD LECTURE

6 February at 5.45 p.m. Mr. H. M. Llewellyn, B.Sc., A.R.I.C., on :—

"PAINTING PLASTER"

1. The recommendations for painting plaster in Post-War Building Study No. 5 are now being amplified and incorporated in Codes of Practice. The lecture illustrates the principles on which the recommendations in these Codes will be based, with special reference to "Design Considerations."

2. Dry, sound plasterwork lends itself well to a wide range of paint finishes but under practical conditions results are sometimes disappointing. Most failures, however, can be avoided by taking suitable precautions in design and technique if the causes are understood.

3. *Common causes of failure.*

(*a*) Saponification—chemical attack on the oil by alkaline plasters and cements—effects of different materials—preventive measures—drying—use of alkali-resistant paints—certain pigments are affected by alkalis.

(*b*) Loss of adhesion—how does paint adhere to plaster?—experiments on adhesion—effect of moisture—advantages of porous coatings—defects due to imperfect hydration of porous coatings—defects due to imperfect hydration of plaster—priming Keene's "following the trowel."

(*c*) Flaking of distemper—effect of repeated wetting and drying—condensation—paints for surfaces subject to condensation.

(*d*) Efflorescence—sources of salts—effect of continuous passage of water through wall—precautions—occasional effect of distemper in inducing efflorescence.

(*e*) Organic growths—moulds, algae, bacteria—incidence and treatment of mould growth—blackening of paint due to sulphate-reducing bacteria.

Fayer

Sir Patrick Abercrombie, M.A. [F.], Royal Gold Medallist, 1946. Formerly Professor of Civic Design at Liverpool University, he has been Professor of Town Planning at London University since 1935. In addition to his work on the County of London Plan (with Mr. J. H. Forshaw [F.]), and on the Greater London Regional Plan he is also consultant for the replanning and rebuilding of Plymouth, Hull, Bath, Edinburgh, Bournemouth and the Clyde Region. He was Vice-President R.I.B.A. in 1937-39 and for many years Chairman of the Town Planning Committee. He is a Past-President of the Town Planning Institute, and a member of the Royal Fine Arts Commission, the Royal Commission on the Location of Industry, the Miners' Welfare Commission and the National Camps Corporation. He is also Chairman of the C.P.R.E. and of the Housing Centre.

NEW YEAR HONOURS LIST

THE PRESIDENT KNIGHTED

All members will have been delighted to read of the knighthood conferred on the President, Mr. Percy Thomas, in the New Year Honours List.

In addition, Mr. T. P. Bennett, C.B.E. [*F.*], and Mr. F. C. Mears, P.R.S.A. [*F.*], have been created Knights Bachelor.

Mr. A. W. Kenyon [*F.*] has been awarded the C.B.E. for his services as consultant to the Ministry of Works.

The Rt. Hon. Winston Churchill [*Hon. F.*] has received the Order of Merit.

Mr. Ernest E. Morgan [*F.*], Mr. Joseph Weekes [*F.*], Mr. L. W. Hutson [*F.*], Mr. Arthur Bailey [*A.*] and Mr. G. E. P. Jackson [*A.*] have been awarded the O.B.E. (Civil Division).

Major Walter Barrett [*A.*] and Captain J. K. G. Sarjeant [*A.*] have been awarded the M.B.E. (Military Division). Mr. K. M.

Winch [*F.*], Mr. S. M. Evans [*A.*], Mr. Ronald Carswell [*L.*] and Mr. E. C. Higman have been awarded the M.B.E. (Civil Division).

Other awards of interest to members include an O.B.E. (Military Division) conferred on Lieut.-Colonel G. Essame, the new Assistant Secretary of the Royal Institute, and a C.B.E. (Civil Division) has been conferred on the following :—

Mr. G. W. C. Buchanan, President, N.F.B.T.E.

Mr. C. T. Every, F.S.I., lately Director of Post-War Building Programmes, Ministry of Works.

Mr. A. C. Richmond, Land Settlement Association.

Mr. Michael Rowe, K.C., lately Deputy Secretary, W.D.C.

Greetings from the Society of Chinese Architects

The Council Luncheon Club on 11 December had the pleasure of a visit from Mr. T. P. Yang, a member of the Executive Committee of the Society of Architects, Chungking. He presented the Royal Institute with a finely written scroll conveying the good wishes of the Society of Chinese Architects to the Royal Institute.

The letter inscribed in the scroll was as follows :—

To The Royal Institute of British Architects.

Chungking.
7 January 1944.

Dear Sirs,

The Society of Chinese Architects, taking advantage of the inspection trip abroad of Mr. T. P. Yang, member of its executive committee, hereby appoints him to convey to you this letter with its very sincere wishes.

Your Institute, whose guidance to the practice of architecture in the British Empire has long been reputed for its fine tradition handed down through the ages, is now on the eve of an even brighter future in which the sun will forever be shining. The talented architects from the Five Continents are found gathering under your roof, and the worthy examples you have set will surely be emulated for many generations to come. As we watch your progress though from a distance, we are filled with admiration which is beyond description.

The members of our Society on their part have been during the past few years doing everything within their power to help carry out China's reconstruction in the rear under the most difficult conditions owing to the shortage of materials. These difficulties, however, have not caused them to relax their efforts, for they are well aware that the architectural profession is not only one with an old history, but it also ranks high and honourable among other professions, being entrusted with an important mission ; and, as to its spirit which stands for righteousness and public service if developed to its fullest extent, will certainly not fail to make a great contribution to the constructive work of the world as well as to the welfare of humanity as a whole.

Now Great Britain and China are comrades-in-arms ; also your good selves and we are fellow architects. If, therefore, we shall respond to the calling of each other as people of the same ideals, and if we should further base on the principle that the whole world is but one big family to participate in the work of inaugurating a new era after the conclusion of the present war, our Society will be only too pleased to do our small part in co-operating with your Institute so that we may successfully discharge the duties of our common profession. It is our earnest desire that you will be good enough in future to give us your guidance and assistance through your richer experience for which we shall be much obliged. Words fail to express our thoughts completely, however, and we conclude by sending you our greetings of the season.

Yours faithfully,

The Society of Chinese Architects.

The International Reunion of Architects

The British Section of the International Reunion of Architects met on 6 December 1945 at the R.I.B.A.

The object of the Reunion is to promote understanding and co-operation among architects, and to set the foundations of a co-ordinated exchange of information which is so vital at present.

An Executive Committee and a Sub-Committee to consider the publication in London of an International Bulletin were set up.

Mr. Gordon Stephenson reported on his mission on behalf of the British Committee to Paris.

Some recent foreign periodicals

It was decided to take steps to get in touch with American, Soviet, Dutch and Dominion architects.

The members of the Committee are as follows :

President :
Professor Sir Patrick Abercrombie, M.A. [*F.*], P.P.T.P.I.
Hon. Secretary :
Mr. E. Goldfinger, D.P.L.G.
Hon. Treasurer :
Mr. F. E. Towndrow [*A.*].
Members :

Miss E. Denby [*Hon. A.*].
Mr. J. H. Forshaw [*F.*], M.T.P.I.
Professor W. Holford [*A.*].
Mr. A. G. Ling [*A.*].
Mr. H. S. Goodhart-Rendel [*P.P.*].
Mr. W. David Hartley [*F.*].
Mr. Colin Penn [*A.*].
Lt.-Col. Cart de Lafontaine, O.B.E. [*F.*].
Mr. F. Lorne [*F.*].
Mr. B. Lubetkin.
Mr. T. Sharp [*F.*], P.T.P.I.
Mr. G. Stephenson [*A.*].
Mr. J. Summerson [*A.*].
Professor Sir Charles Reilly, O.B.E. [*F.*].
Mr. H. Robertson [*F.*].
Mr. F. R. S. Yorke [*F.*].

Foreign Periodicals

During the last few months one of the chief excitements in the R.I.B.A. Library has been the arrival of new and resurrected architectural periodicals from all over the world. During the whole of the war, the Library, with considerable foresight, kept a reserve stock of R.I.B.A. Journals and by gift and purchase accumulated other British publications to be the basis of exchanges with our liberated colleagues in Europe. This careful policy has been well worth while. The knowledge that the Institute is able to help European libraries to rebuild their stocks has, of course, attracted visitors and few of them have arrived without gifts to the Institute.

The picture at the head of this column shows journals from France, Norway, Denmark, Sweden and Switzerland. Since the picture was taken we have received a copy of almost the complete war-time issues of the well-known Danish journal *Arkitekten*, the Czechoslovakian *Architektura C.S.R.*, and of a new Dutch journal, *Bouw*.

Members Serving with the Forces

MISSING, BELIEVED KILLED

Hill, T. J. T. [*S.*], Sgt. Indian Engineers.

DECORATION

Bertram, S. N. [*A.*], Major R.E. Awarded M.B.E. (Military Division).

MENTIONED IN DESPATCHES

Aitken, F. Keith [*A.*], Sqdn.-Ldr. R.A.F.
Frith, A. G. P. [*A.*], Major R.E.
Jenkinson, A. D. P. [*A.*], Capt. R.E. (Twice Mentioned).
Rowe, O'B. J. L. [*S.*], Major R.A.
Trehearne, F. P. C., M.C. [*S.*], Major R.A.
Webster, Douglas A. S. [*A.*], Lt.-Col. R.E.

Members from Japanese P.O.W. Camps

Information has been received that the following member has been released from Japanese hands and is safe and well :—

T. A. L. Concannon [*F.*].

In the November Journal one name was printed as F. C. Garrow Gregor-Grant [*A.*].

This should have been *Garrow Gregor Grant* [*A.*].

SCHOOL PLANNING AND CONSTRUCTION

C. G. STILLMAN [*F.*]

A PAPER READ TO AN INFORMAL MEETING ON TUESDAY, 11 DECEMBER, 1945

THE PRESIDENT IN THE CHAIR.

MR. STILLMAN: Mr. President, ladies and gentlemen. In opening this talk I do not wish to make apologies, but I feel I must explain that my recent move from West Sussex to Middlesex has left me little time for the necessary preparations to do full justice to a subject of this importance.

I need hardly point out the magnitude of the problem. It is enough to say that we have before us a school-building programme of unprecedented proportions, urgency and perplexity. The scale of the programme is so immense, so fraught with problems and difficulties, that quite a number of years must elapse before it can be put into anything like full operation, and no one can say how long it will take to complete, if it ever reaches completion.

Furthermore, it will take quite a number of years before we shall know with any degree of accuracy and full understanding the real nature of the building requirements and how to carry them out; but this is not to say it is a matter that can stand delay. In its technical aspects and from points of view of design, the housing problem in comparison is a relatively simple matter.

Many people think that the Butler Act is incapable of application, and I think that anyone who has studied the Act will agree that, in all its implications, a considerable period of trial and error must be allowed before its manifold secrets and hidden snags can be brought to light.

Consider the implications contained in this quotation from the Act: "The Schools shall not be deemed to be sufficient unless they are sufficient in number, character and equipment to afford for all pupils opportunities for education offering such variety of instruction and training as may be desirable in view of their different ages, abilities and aptitudes, and of the different periods for which they may be expected to remain at school, including practical instruction and training appropriate to their respective needs."

Those brave words may be said to be our terms of reference.

In the short time at our disposal this evening it will be impossible to do more than to touch upon the main points of immediate interest, and I should like to introduce some of these matters by referring to the recent Report of the Royal Institute of British Architects' Committee on School Design and Construction. This report gives a very good outline of the technical problems involved, and in this respect might be taken as the basis for this talk.

To begin with, it refers to speed as a vital necessity and expresses doubts with regard to pre-war methods of construction being sufficiently expeditious for fulfilling all the needs. The question of availability of materials and labour is dealt with, and this leads up to the main point for consideration: the type of building which will accomplish all that is required in the quickest possible time.

Apart from the leeway to be made up and the actual losses due to the war, education needs have so completely outgrown existing accommodation that they now require almost entirely re-equipping with a new set of buildings. Not only does further progress depend upon it, but education, as it is being practised to-day, with the deterioration due to the war, will deteriorate still further until the essential improvements in building accommodation can be provided. All this will be only too clearly revealed when education authorities have had time to formulate their development plans and apply the new yardstick of the Building Regulations to their schools.

I can give you one example from a survey made of a mixed selection of rural schools, one hundred in all, including a small proportion of newer schools. The number of schools unsuitable for remodelling, taking into account the cost and time and materials to be expended, site restrictions, and the difficulty in closing the schools during building operations, approximates to 84 per cent. Of the remainder suitable for remodelling, only a few show a saving of more than 20 per cent. over the cost of a new school.

So many of our schools belong to that period of history—the first half of the nineteenth century—which produced both the worst type of building and the worst type of unplanned

development : gas works, warehouses, factories and goods yards, etc., intermingled with schools and hospitals and ugly mean streets, all tightly jammed together, leaving no room for expansion or improvement of any kind. The school buildings, still in the worst atmosphere of Dickens, are in every way unfit for the upbringing of children.

So seriously and so urgently is the accommodation question regarded by the Government that in order to implement the raising of the school-leaving age, already many times deferred, education authorities have been told that for the next three years the additional classrooms required must be provided by way of temporary war-time huts. These will be erected by the Ministry of Works in playgrounds and playing fields or on sites to be acquired, with little or no regard to permanent development. Whilst this is an emergency scheme intended to bridge the gap until permanent building can get going, it is quite obviously an extremely costly and uneconomic expedient. Once up, it will be many years before we shall be in a position to scrap these huts and expend the double labour and materials in replacing them. We had the same experience after the last war and the huts then built still remain to-day. I have no doubt that many of you have had experience of this sort of thing and could quote cases going back even further of temporary buildings still standing to-day. No time limit is specified in the exemption to be granted by the Ministry of Town and Country Planning in the special varying order just issued.

A head teacher in charge of a hutment school recently admitted some children from the Belsen Horror Camp. When asked, " What was it really like at Belsen ? " the children looked around and said : " Just like this, teacher."

I have spent some time on this introduction, because I regard it of enormous importance to establish the background upon which we have to work. Despite all the difficulties, we must remember that we are starting afresh and the work we do now may have to serve the needs of education for the next hundred years. We should be preparing the way for a new epoch in education.

When we see how hopelessly obsolete our present buildings have become and how rapidly obsolescence can take place in the normal life of a well-built school, we find this a further point for consideration in deciding the type of school we shall build.

So far, therefore, the first three factors are : (1) Speed of erection ; (2) new methods of construction ; and (3) the problem of rapid obsolescence. I can now add a fourth which will influence design very considerably, and that is the improvement and control of daylighting in all teaching rooms. This is a new factor upon which a great deal can be said. Planning against noise disturbance is a fifth point of importance. There are many other new aspects of school planning which must be taken into account.

The step-up in total floor area (the need for a great deal more space) and the increase in essential equipment will call for every possible economy in the fabric design, and this leads us again to the conclusion that we are entering a decade of strictly utilitarian building. On this point the R.I.B.A. Committee has said : " The success of utility building, from the architect's viewpoint, lies in the assemblage of the component elements of the plan into a well organised composition, in the full and correct use of colour and texture, and in a pleasant treatment of the site layout. Much can be done to enhance the appearance of a simple building by imaginative planting of trees, shrubs and flower beds and the arrangement of approach ways to the school."

May I say here that I was recently taken to task when I said : " With all modern buildings, we should be able to take for granted such things as good sanitation, efficient heating and ventilation, and structural stability." I repeat that these are largely matters of ordinary good practice, the standard for which is fully covered by the Building Regulations and can be arrived at by the application of known formulæ, and by calculation.

The more difficult problem for the architect, particularly with the present restrictions, is to capture and provide the right æsthetic note—the right spirit and environment to suit the particular occasion or to fit the particular purpose—for which there is no scientific formula. I still stand by this and I believe that the architect's task has become far greater, from the design point of view, to extract the best out of these utility buildings. It will require the exercise of a higher level of architectural skill than has been the case in the past.

The Report goes on : " The school is the physical background to the early and impressionable years of a child's life and the environment of the building and its site-setting created by good design will exert a beneficial influence in character-forming at the most receptive age. The child's mind is receptive to the appeal of simplicity in line and form and reacts with enthusiasm to the influence of colour and texture. Upon the architect's degree of insight into the mind of the child will depend the success of his work. A school should not become so detached, architecturally speaking, from its primary purpose as to bear oppressively on the minds of the young."

To quote Sir Robert Wood, when speaking here at a conference some time ago : " I suppose that the two ultimate elemental factors in education are, first, environment, and, secondly, personal influences. Those two factors are represented by the school premises and the school teachers."

Before I end these general remarks, I should like to spend a few moments by way of prefacing the slides I am about to show.

First, I must stress my belief in the absolute need for an entirely new approach to school planning and construction. According to Sir Frederick Mander, school building has hitherto been a relatively leisurely occupation. The erection of a single school was often an isolated incident in the history of a local education authority (this hardly applies to Middlesex) and the building of a number at one time was a very considerable enterprise. I think there is a lot of truth in this.

Also, we have been accustomed to think of each school as an isolated problem, designed to express individuality and to provide a permanent and complete architectural composition. Where at one time an architect could devote the time and thought to the design of one, two or three schools at a time, he may now have to deal with ten, or perhaps twenty, and he must think in terms of schools that run in certain uniform types and sizes, but are not necessarily in their complete and final form. We must find new ways and means of providing good and satisfactory building accommodation in such a manner as not to stabilise conditions.

This has led to the idea that we should build in a less durable manner and for a shorter life. But what is the shortest life for which we can build economically ? We still talk rather unintelligently of " temporary " and " permanent " construction, and I often wonder what is really meant by these terms. I notice that in the recent report on " School Building for Scotland," there are recommendations for building temporary schools to be followed later with permanent schools on the same site.

We are apt to forget that, in schools particularly, a great part of the cost is spent on essential services, installations, site works, playgrounds, etc., where the initial cost and the upkeep cost cannot be varied to any degree, since for this class of work there is but one standard. Except in cases where floor areas are reduced below accepted standards, the difference in capital outlay is extremely small, as it can only be applied to the " shell," and since it is rarely possible to build schools with expensive " shells," it is extremely difficult to effect much in the way of saving. My experience is that on the cost of the " shell " one has something in the region of about twenty per cent. in which to effect any economy, so that on the total cost of the school it is very difficult to make much more than a seven or eight per cent. saving all told. It, therefore, resolves itself into the difference between an economic or an uneconomic building, one good, one bad, but both capable, with maintenance, of lasting much the same length of time.

I think it is time we dropped such terms as "temporary," "semi-permanent," and "short term" construction. Buildings do, however, fall into a number of classifications. We can make a proper distinction between "wet" and "dry" construction, or between "masonry" building with load-bearing walls, and "frame" buildings with point loading. These two types of classification may also be termed "heavy" and "light-weight" buildings, but I would prefer to make the distinction more definite and suggest for this purpose using the terms "Code Standard" and "Sub-Standard."

When we refer to "Code Standard" planning and construction, this will mean the full schedule of accommodation to be complied with under the new Building Regulations of the Ministry of Education. We could also include British Standard Specifications and recognised Codes of Practice.

"Sub-Standard" planning and construction means reducing the floor areas in teaching space and ancillary accommodation; reducing the number of wash basins, W.C.s, sinks and fitments, etc.; cheaper means of lighting and heating; using less expensive finishings, such as roof coverings, infilling walls and partitions; and omitting plaster work, wall tiling, painting, etc.

Where it is impossible, in the first place, to build to "Code Standard," some form of "Sub-Standard" accommodation must be adopted. There are, however, two forms of "Sub-Standard" building: one, a "Sub-Standard" form so constructed as to be incapable of further improvement; this type must remain "Sub-Standard" throughout its maintained life. The second is a "Sub-Standard" form designed in such a way as to be capable of later improvement, and it is this temporary form of "Sub-Standard" building that I wish to suggest for your consideration.

If the building project is planned in its final conception, it can be carried out in progressive stages, with the minimum of waste, to its ultimate completion, and in accordance with the "Code Standard"; but to do this the framework of the buildings, i.e., the skeleton, must be designed to provide for "Code Standard" requirements. If this is done, the framework can be covered with a "Sub-Standard" shell as a first step in the development. The "Sub-Standard" shell, which includes the roof, the infilling walls and finishings, can be varied in the degree to which it is "Sub-Standard" according to the availability of materials and labour.

If the chassis or frame is sufficiently well designed, accommodation can be provided for an innumerable variety of treatments, some parts of which may not necessarily be "Sub-Standard," or, if they are, only so until such time as a finishing work will bring them up to the "Code Standard."

Both "Code Standard" and "Sub-Standard" construction can embrace standardised prefabricated units to a greater or lesser degree, according to the system employed; or, on the other hand, the principles I have outlined can be carried out according to traditional methods. No form of standardised construction should be used which is not fully flexible of application. In order to avoid monopolies and bottle-necks in production, alternative methods of constructing standardised designs are desirable so far as possible.

I would now like to put before you, by way of illustration, one or two exploratory suggestions for the type of buildings, and the planning arrangements, which would appear to arise from these remarks.

Figure 1 is of an infants' school showing the interior of the quadrangle with the open type of verandas. Figure 2 is of the same school, indicating the difficulty of obtaining adequate daylighting to the classrooms on this type of quadrangle plan. The small clerestory windows are used for cross-ventilation. You will notice that we obtain very little help from the use of the highly pitched roof.

The rather clumsy effect of the weight-bearing brickwork will be noticed and the unnecessary obstruction to daylighting. This construction is slow in erection and does not lend itself to structural alteration, despite the fact of it being in this case a one-storey building with a fairly open plan, compared with many

Fig. 1

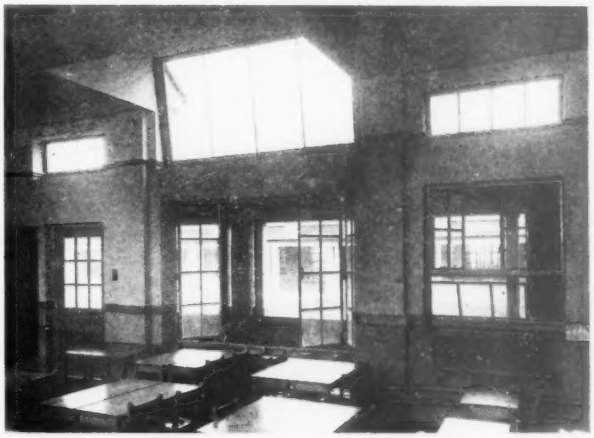


Fig. 2

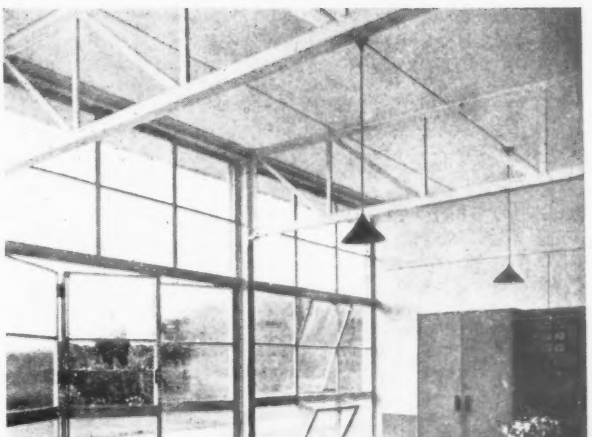


Fig. 3

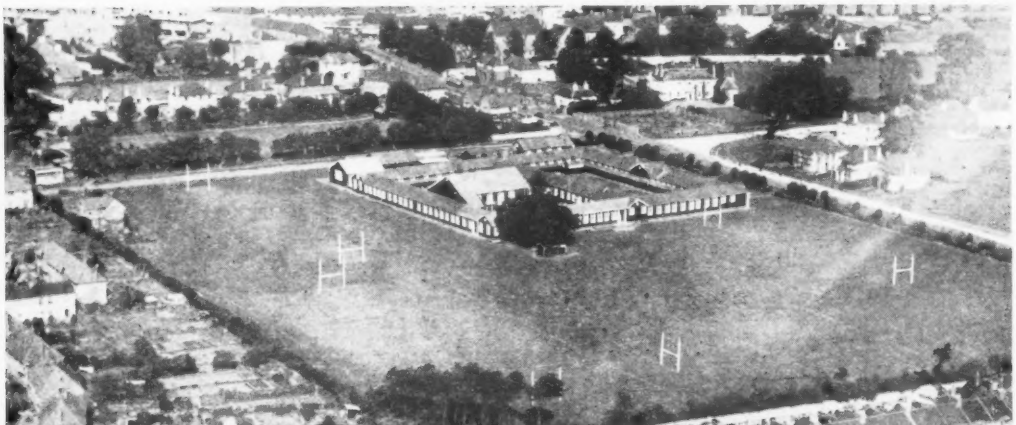


Fig. 4. "A so-called temporary school" built in 1922—sub-standard and expensive

worse cases found in the older types, such as some of the Voluntary and Board Schools with their more compact plans.

In comparison, we have the type of classroom shown in Figure 3, showing how fullest possible use is made of the window area.

Before I pass on to these light steel classrooms, there are one or two other types I should like to refer to. A school by Dudok at Hilversum illustrates one or two points I am anxious to bring out. It shows the treatment of the classrooms in rather lighter vein. It shows how this treatment is used architecturally to act as a foil to the heavier mass obtained by the use of brickwork. I wish to make the point that, although in my opinion brickwork offers no advantage in the designing of classrooms, either æsthetically or constructionally, brickwork can be used with good effect for other portions of the school—perhaps to provide a focal point incorporating the main entrance, as in this case, and also bringing in the boiler-house flue. Dudok's school shows how one can combine the prefabricated type of unit construction with *in situ* building. From the point of view of obtaining the maximum flexibility for possible future extensions, care must be taken not to compose the design with a high degree of finality, since the studied character of the composition may be completely ruined by subsequent alterations.

The school in Figure 4 is a so-called temporary-built school of the traditional pattern. It is not a hutment school; it is a purposely designed timber school. It is a Boys' Secondary School in a very important seaside town on the South Coast. It is a double quadrangle plan; the classrooms are sub-standard in size, being 19 ft. wide. It was built in 1922 as a temporary school. The capital saving over brick was about ten per cent., mainly effected by the light asbestos tiled roof and open post verandas. The timber framed walls are load-bearing and are covered with deal weather-boarding. Internally the walls are lined with asbestos sheets. It is an extremely noisy building, draughty and cold despite an exceptionally large and well-designed hot-water heating system. The cement-asbestos sheets are continually being broken, and it has a drab, cheap and nasty appearance. The outside weather-boarding, which was not creosoted under pressure, has been a constant expense in upkeep. During its life of twenty-three years, the neighbourhood has become built-up, which is one of the reasons for showing this particular photograph; the school has become overcrowded and the playing field is much too small. If, as originally intended, a brick-built school was put up to replace it—and this seems most unlikely for a number of years yet—the site occupied by the present school with its foundations, services, drainage, playground, etc., would need to be grubbed up, cleared away and the ground reclaimed for making up the playing field. To do that would mean an immense amount of work. There are over four hundred boys in this school. This all indicates, to my mind, the complete folly of the so-called "temporary school."

We now come to the permanent light steel-framed construction of standard unit design and of code requirements, used in West Sussex before the war, principally for the classrooms.

Figures 5 to 8 show buildings using the standard steel frame designed to the correct height; Figure 5 shows the beginning of it, with the roof being put on first.

Figure 6 shows the finished interior of one of these steel frame classrooms with the light lattice trusses exposed, which saves a good deal of work in forming a separate ceiling. The partitions are of light steel, covered with fibre board. The size of the classroom in this case was 24 ft. across.

Brickwork is used to form the end of the steel classrooms. The infilling at the bottom is cedar weather-boarding.

Figures 7 and 8 show the same classroom with a veranda. There is a light steel frame on the south side, coming off the transom member.

The school at Littlehampton shown in Figure 9 is a more or less standard building with a brick portion which was also steel framed and was more or less of the utility type of building.

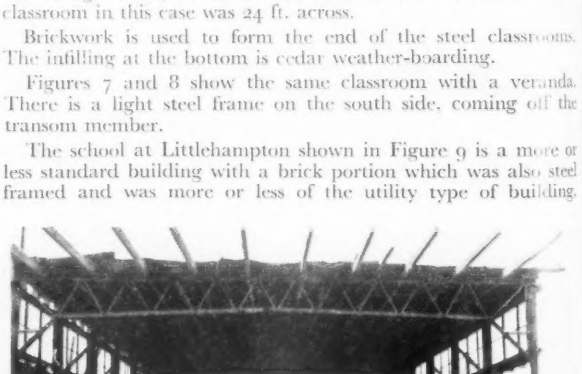


Fig. 5

The walls were unplastered inside. The roofs of the halls were covered with Trafford tiling, which is a heavy asbestos tiling. The whole thing was first a steel frame, which was then covered. The bricks in this case were a rather inexpensive cement and sand brick. Altogether it was what one might describe as one of the utility type of building; in other words, the shell of the whole structure was reduced down to the lowest limits, but all the services, installations and playgrounds were up to the one standard.

Figure 10 shows the open flexible plan of this type of structure. One can see the area from which the playgrounds, service rooms, cloak rooms, lavatories, and so on, all run and form a shield between the noise of the playing ground and the class areas. Then come the quiet little precincts for the classrooms. Each one is orientated to the south-east. This is actually an infants' school and one can see, shut off by a doorway, an infants' hall with the classrooms or babies' rooms at the end. Then there is a junior school, and on the other side of an entrance arch there is a senior girls' school.

A further plan, Figure 11, brings me to the end of what I might call the pre-war examples, after which I hope to show you a few proposals which I call more or less post-war examples. Here is the same idea of using the service rooms to divide the playgrounds from the classrooms. I think it is quite wrong to put the classrooms looking directly out on to the playgrounds, because playgrounds to-day are really physical training grounds, and a lot of physical training work goes on at the same time as people are working in classrooms. The principle of this layout is to avoid that. The hall is situated as you see it because there may be singing or music going on in there when the classrooms are in use. In this case there is a small infants' school with a so-called nursery or babies' room. I showed you a photograph of it previously with the veranda on the south side. The entrances are direct off the playgrounds and they are directly adjacent the lavatories. There is another entrance for the staff, with the staff rooms suitably situated. The medical room in this case is so arranged that parents can use the hall as a waiting room. It was not only used as a medical room for the school, but also as a local health centre.

Figure 12 is the plan which I want to suggest to you has certain principles which are worthy of your consideration, and which I will go through in the light of what I have said about utility buildings. I believe that the first thing we have to endeavour to achieve is simplicity. There must be a straightforward and simple layout. One then wants a certain amount of compactness, but that compactness must be achieved within the framework of an open and flexible layout. We want to provide for free cross-ventilation and correct orientation. In this plan all the rooms face towards the south. The two play areas or physical training areas are open to the sun, which is a very important point. It is very bad to have any buildings so sited that they cast deep shadows on to a playground. It is a matter about which I have heard a great deal from physical training people. Therefore, this area is arranged so that it is open to the sun, but also protected from the north winds by buildings. You can see the position of the gymnasium, the

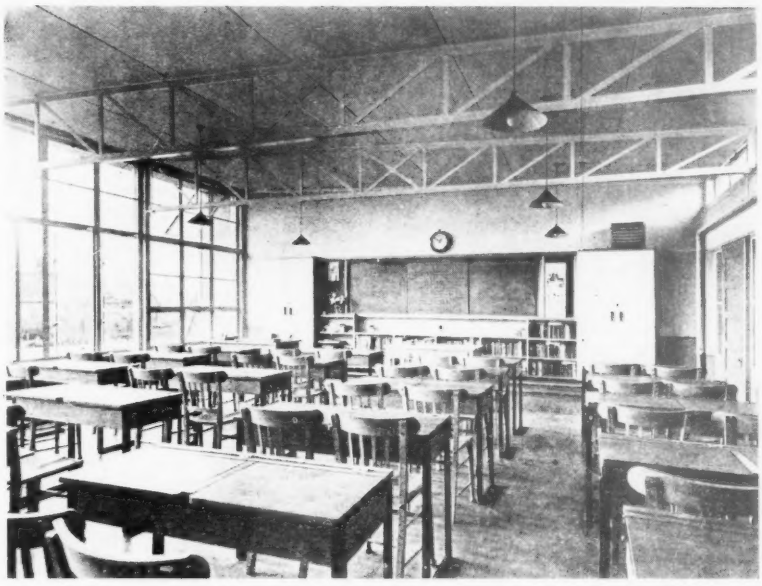


Fig. 6

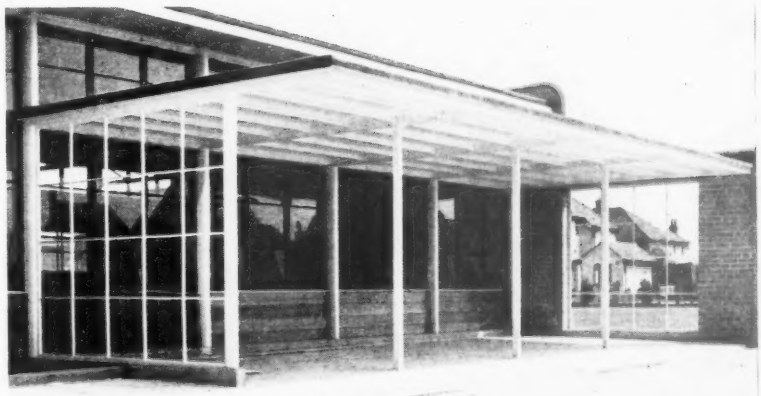


Fig. 7 (above)

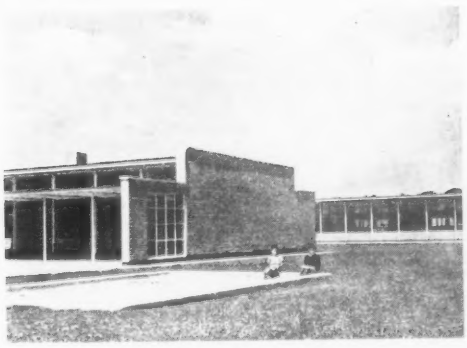


Fig. 8 (below)

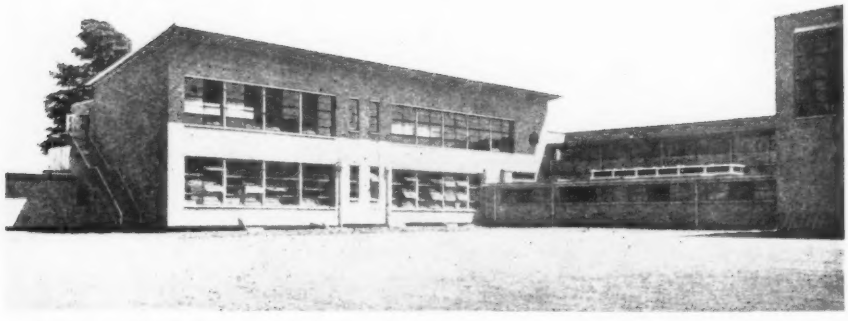


Fig. 9. A school at Littlehampton

changing rooms and the assembly hall. The general circulation is provided for by the corridors shown. You will notice that the whole thing just fits on the three-acre site, which is the minimum allowed under the new Building Regulations. It is a one-storey building. There is the question of noise, to which I have already referred. There is the question of being able to get out and use these little garden plots for outdoor classrooms when required. This plan does incorporate a standard frame, which, merely for the purpose of demonstration, can be used for both the teaching rooms and the ancillary accommodation, except the hall and the gymnasium. It may not be absolutely perfect in every sense, but it does provide for most of the points that one has to endeavour to provide. I have tried out a number of layouts. We all know the faults about the quadrangle plan. The long stretched-out plan (the sort of Z plan) is not by any means good, because it takes up a great deal of ground. Also, I think it is a bad thing to have corridors too long. This layout keeps the corridors reasonably short, and the entrances are very convenient for access immediately on to the playground. The gymnasium has direct access on to the physical training ground. With regard to the situation of the music room, I could think of better places for that, one of which would be deep underground ; it is a room which could well be placed in some remote part of the grounds.

Figure 13 is a cross-section of classroom and shows the frame of the structure. For comparison there is also shown the standard hut frame. The standard hut is a permanent sub-standard building : it is 7 ft. 6 ins. to the eaves and the window must necessarily be too low for lighting. On test one can only get less than half the Code Standard of lighting. It has all the other faults of having a poor sort of covering and so on, but my chief point about it is that the frame is concreted in, and in that sense it is by no means temporary ; it is a very permanent frame : it has a permanent base. The infilling may be less permanent ; but there is no reason, with the ordinary maintenance one has to do with a building like that whilst it is giving service, why this type of thing should not last any number of years you like, and during the whole of that period you have sub-standard conditions. On the other hand, if you adopt the frame which is designed to have the right Code requirements, these sub-standard conditions need not be perpetuated throughout the life of the frame. The frame I suggest is eleven feet high ; it is the right width across. The veranda or corridor illustrated need not be erected at once, if it is desired to follow the lines of the hut frame and not put in a veranda. But with a 7 ft. 6 in. frame, if you want to attach a corridor or veranda to it there is a difficulty with the roof, and it also means that you immediately block out half the light from that side. In the eleven-foot frame we make proper provisions for the corridor ; it need not be built at once if labour and materials are not available ; but it can be added in its correct position at a later date. Also we have the correct cross-ventilation and by applying methods which have been developed we can get all the Code requirements as regards the daylight factor. Although it is not shown on this diagram, ducts can be put into the base when the first part is being built. Even if this particular structure is heated in the first place by stoves, which, of course, it can be, provision can be made later for installing hot water heating by a correctly designed circuit. There is provision for an overhead duct which can be used for hot water pipes, water pipes, gas pipes and electric conduits, which can be brought down to serve any point. Therefore this sort of structure can be used for ordinary classrooms or practical rooms, such as science and art rooms. In fact, it can be used for anything. One point in connection with the raising of the school leaving age is that we shall not necessarily want just classrooms ; in many cases practical rooms are needed. You cannot get a good practical room out of the 7 ft. 6 in. structure ; it is not wide enough. In the eleven-foot structure we have all the Code requirements in the skeleton or frame. The covering material can be of sub-standard character, if necessary, to begin with ; the roof can be in the form of asbestos decking or other types of covering ; and we may have, and probably will have for the time being, a rather cheap type of roofing felt ; but that does not prevent the whole being covered later with a proper asphalted roof. On the question of the time factor and the man-hours required, I am personally quite satisfied that the type of

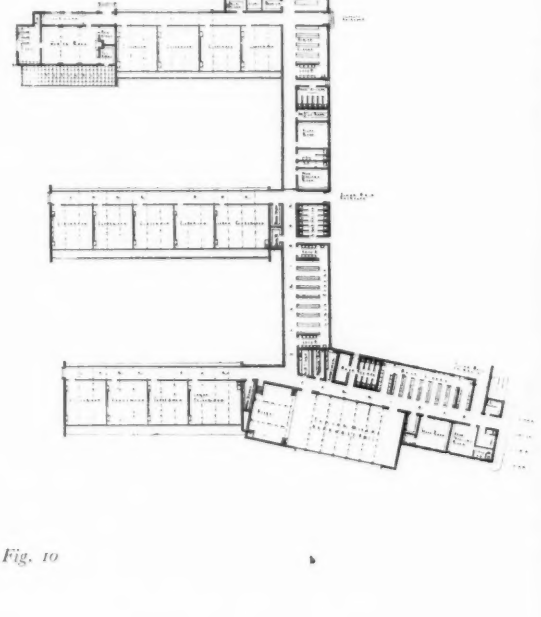


Fig. 10

structure shown can be erected in less time perhaps, and certainly with no more expenditure of man-hours, than the hut.

Mr. E. W. Roberts, County Architect of Nottingham, built a school kitchen in competition with the standard hut. Mr. Roberts tells me that the man-hours used in the erection of the same size of hut for a kitchen was 9,000 man-hours, and this brick kitchen consumed 10,000 man-hours. That does show that there is not all that difference in the time taken and the materials used in the erection of these war-time huts.

Figure 14 (lower part) is a lighting diagram for the frame classroom. The object was to obtain even intensity of daylighting right across the working area. We have endeavoured to depress the lighting at some points and lift it up at others by the use of this special North light which some of you have seen in the model. The attaching of an extended hood to experiment with the prevention of excessive sun glare can be done once one has got this type of frame construction. It is not necessarily a permanent hood. One has got to give a great deal more thought and time to the quality of daylighting and to do what one can to prevent sun glare, which is, of course, a most important consideration.

On the upper part of Figure 14 is an illustration of the end construction, which is absolutely permanent so far as the frame is concerned. You get accommodation for cupboards. The windowing can be of any type. The window space can be filled with windows opening down to the floor or not, as may be required.

Figure 15 illustrates use of floor space. I think most people will agree that the 520 or 620 classroom will not be the same classroom which will be wanted in twenty years time. In fact, there is a strong tendency for larger classrooms, and the requirements have not changed very much in that respect. The classrooms are very much the same as they have always been. We get, of course, an advantage when the classrooms can be reduced from holding 40 to 45 to holding 30. I say "when," but that will be a long time. What I want to demonstrate here is the flexibility of the construction. Here we have four of the standard type of classroom. There are three bays to each class. The same construction could be quite easily converted to give this type of arrangement. It is an arrangement based on an experimental school which Neutra, the American architect, has built. It might be very useful for Infants' and Juniors' schools, or even for nursery schools. It combines the outdoor classroom with the indoor classroom. It has some rather good features. The roof at this portion would be cut away, the frame remaining, but you get a glazed window giving light. The position of the teacher's desk and blackboard is shown, with the desks orientated round them, but you do not get the doorway in the usual place. You enter from it what might easily be a small class cloak-room. Alternatively, it could become a little classroom where you have your sinks and lockers, which could

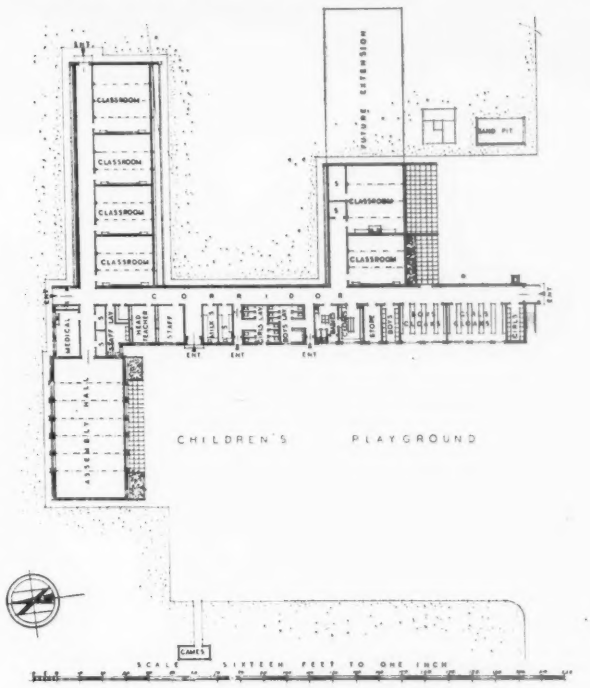
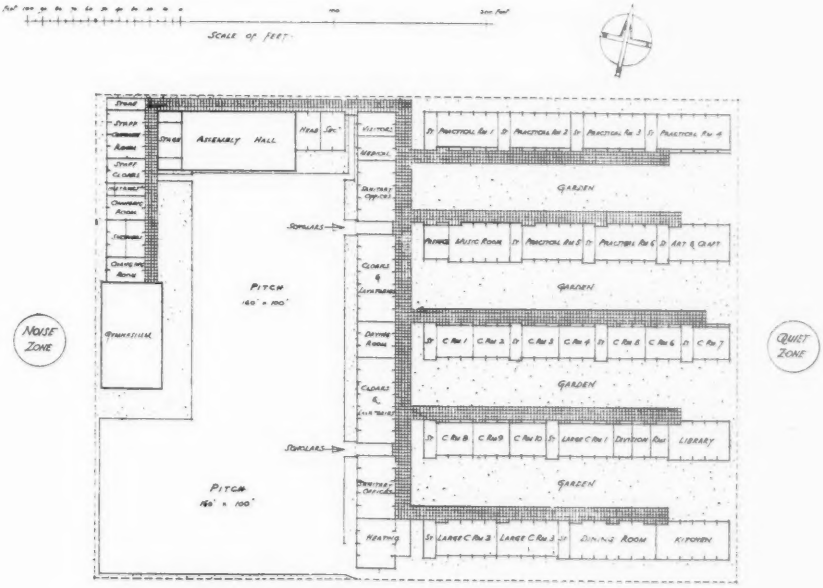


Fig. 11



TYPICAL SECONDARY SCHOOL · 3-FORM ENTRY · · LAY-OUT DIAGRAM ·

NOTE · THE AREA WITHIN THE DOTTED LINES EQUALS 3 ACRES ·

C. G. STILLMAN, FRIBA
COUNTY ARCHITECT.

Fig. 12 (to right)

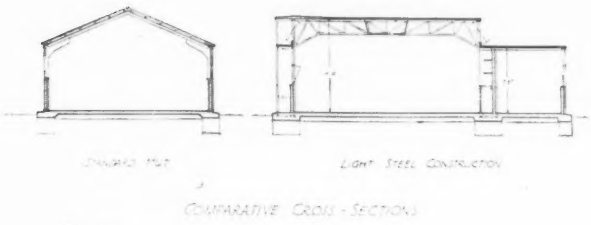


Fig. 13

be a very useful adjunct to a classroom itself. You can go out on to the little sheltered area, which is open above, and with a little planting you could turn it into a very pleasant place. The resulting form is shown in Figure 18.

Figure 18 is a purely hypothetical plan involving the same principles as I outlined on the rather formal utility plan which I showed you previously. You can see the physical training ground, with the gymnasium and changing rooms. In this case there is provision for a swimming pool, which no doubt will come. The teaching units are set apart in the grounds, where they open on to the grass or garden precincts. There is the central hall, which can be *in situ* built, not employing any particular type of framework. Off it one gets the dining-room, which again can be in the standard type of frame. This plan shows a mixed school, with a boys' entrance and a girls' entrance. It has the advantage of siting the hall where it can easily be used as a social or community centre. As time goes on, we expect schools to be used more extensively by adults. From the point of view of social

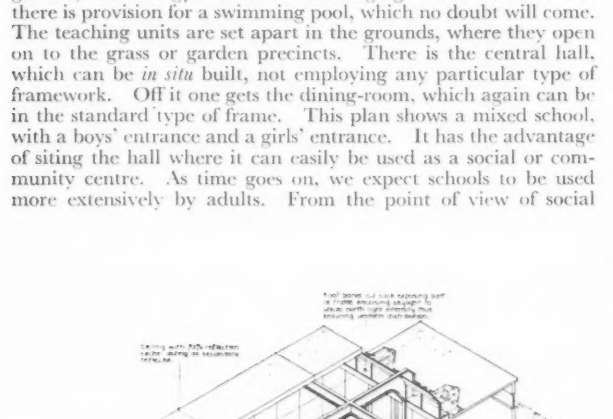


Fig. 14

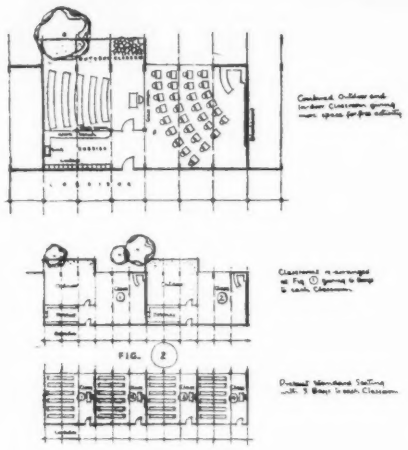


Fig. 15

activity, you can get into this hall without wandering round a lot of corridors and going into the rest of the school. The physical training area is cut off from the teaching area by the ancillary accommodation. I have shown a variety of treatments of the classrooms, using the same type of framework. You get the three-bay classroom with a store or cloakroom, and with outside access by the little lobby in that bay. There are the library and the art room put away more or less in the quiet area. There one can get additional width by throwing in the eight-foot corridor space. You can get a very wide room in that way. Then there is the domestic or manual work centre, and there is the science section. It is the fact that one could build all that with standard frames, with the exception of the hall and the gymnasium.

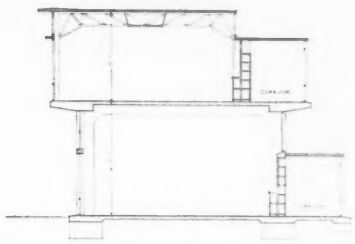
Figure 16 indicates the problem of obtaining the new daylighting factors with a two-storey building. Ordinarily we have difficulty, with one corridor on the ground level and another above it, in getting any light on one side of the classroom. We can get ventilation, but it has to be ventilation through the corridor to the outside window. If we try to get direct air ventilation here, we should do something of this kind. Furthermore, in this plan we tried to get some bilateral lighting on the ground floor classroom in the way one does with an ordinary ground floor classroom. In any case, even by doing that, we cannot get the 2 per cent. It actually gives us 1.5, where the desirable lighting factor is really 5 per cent., although the actual minimum in the book is only 2 per cent. If you try to get it all from one side, it means we shall have to go up even higher. This one is 14 ft. high. Even then, we have the disadvantage of getting a very high light intensity at one point, which is bad distribution of light along the whole working plane. Again this drawing indicates how one could still use a light standard type of frame mounted on the heavier frame underneath. There are, of course, a number of different ways of doing it, but I merely put this slide on to demonstrate a very difficult problem.

The headpiece and Figure 19 illustrate the model which I have had made to develop the points which I have been explaining.

To get good lighting there is only one thing to do (I have had it confirmed by real experts on daylighting) and that is t

cut the roof back to get a certain amount of direct vertical lighting into the back part of the classroom. I think with corridors on the north side we are rather inclined to put an unnecessary amount of glass there. You do not want an enormous amount of light in a corridor, and you do not necessarily want vision. You want all the vision you can get on to the pleasant south side, but if you have another classroom behind it, it is better to curtail some of the windowing of the corridors. It also helps the thermal insulation on the north side.

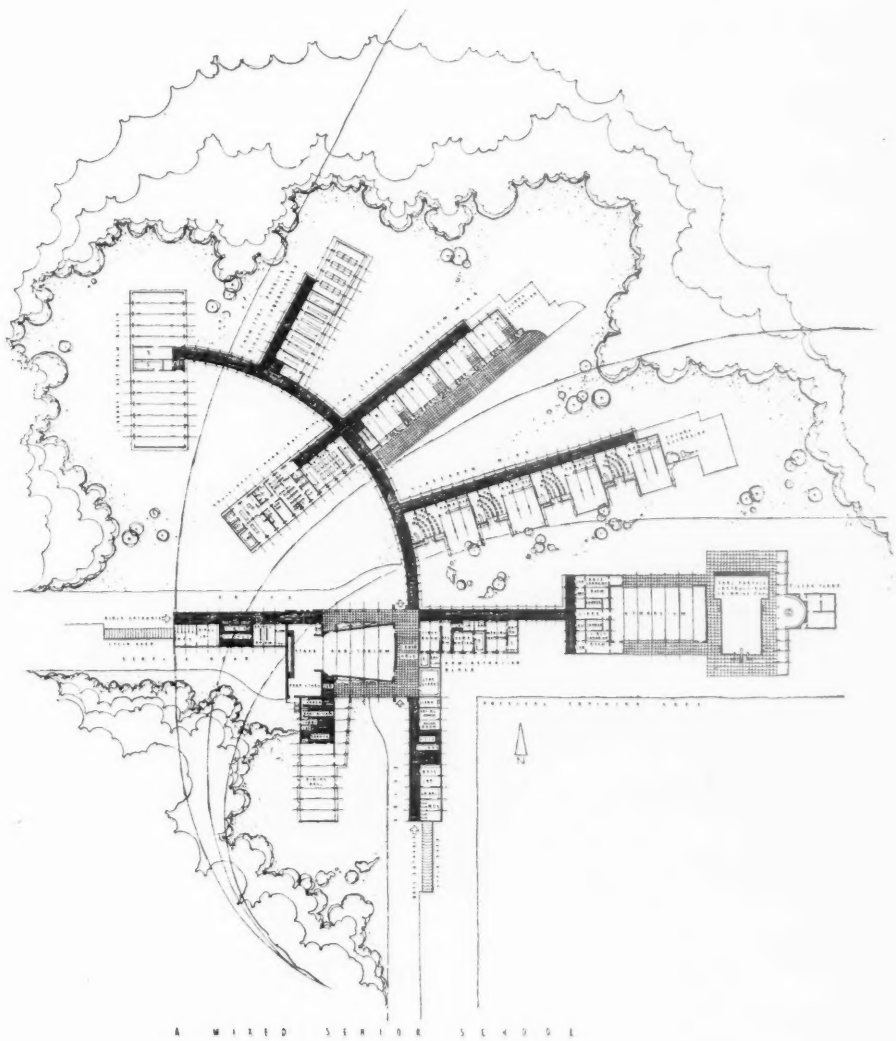
Figure 19 also shows the treatment of running past the uprights below the transom level and using local material, either stone or brick. Where these rooms are divided up as staff rooms (as in this case) and a medical inspection room, with a cloakroom running round part of it, one can dispense with windows or put *in situ* windows, because you get this top lighting maintained above the transom level, so that below that transom level one is more or less free to treat it in an individual manner.



TYPICAL CROSS SECTION
TWO-STOREY CLASSROOM BLOCK

Fig. 16

In conclusion, I want to say that in the very short time at my disposal I have tried to give you an indication of the problem rather than to propound a fully considered solution. I am afraid, and I think many of you will agree, that hutments are not the answer; they will merely stand in the way of progressive development, and will certainly cause delay in the long run. I think a good deal of time has already been wasted since the Board of Education convened a committee to go into this problem some year or two ago, and, as far as the outside world knows, nothing appears to have been done in following up the recommendations of the committee. There was a suggestion that they should be followed up by a committee or body of technical people. I think that a valuable opportunity has been missed in this respect. I think the problem is of such importance that education authorities should have been given, and still could be given, the utmost encouragement—together with professional bodies, of offering suggestions, possibly aided by the sponsoring of some form of national competition. I think the problem is one which cannot be just lightly dismissed in this manner by the use of these war-time huts.



A MIXED SENIOR SCHOOL

Fig. 17 (to right)

Vote of Thanks and Discussion

Extracts from the Speeches

MR. T. B. WHEELER, M.A.: Mr. President, ladies and gentlemen. It is an honour to be asked to propose the vote of thanks to Mr. Stillman this evening. It is also a great pleasure to me to do so. You no doubt know that we have had the pleasure of welcoming Mr. Stillman as the new county architect for Middlesex in recent weeks. The Council feels that it has acquired a very distinguished chief officer who is an architect of enterprise and initiative, and the officers of the Council feel that they have acquired a very delightful colleague.

As he himself has hinted, before the war, school building was by no means an occasional event in Middlesex. We were erecting something like one school a fortnight, and, as far as I can see, the amount of building which will have to be done in Middlesex, as soon as the present restrictions imposed by lack of labour and material have been removed, will be enormous. I think there will be ample opportunity for experiment and initiative, and full scope for the skill possessed by Mr. Stillman and his colleagues.

I am sure we have all learned a great deal from Mr. Stillman's address to us to-night. He has put it forward in a very interesting way, and I feel personally grateful to him that, as befits a good educationalist, he has brought visual aids to his assistance and to mine. Like those of us on the education side, I can see that you on the architectural side are very concerned about the possibility of the erection of a large number of these huts. We do not like them from the educationalist's point of view. I am sure, from what Mr. Stillman has said, that as architects you like them even less.

From the educational aspect huts have two objections. The first is that we do not like their habit of sprawling all over the school site, especially in a county like Middlesex, where school sites are often restricted and land is extremely valuable. We would like to see something which will leave more of the land available for playing fields.

Secondly, we dislike them because we think they are æsthetically so unattractive. We share the view of the Committee of Architects which was appointed by this Council that a beautiful school building is itself an instrument of education with a great formative influence in the life of a child. We think that these huts will deprive the child of those influences during its most impressionable years. We on the education side will be very glad if this Institute and professional architects generally will do all in their power to get as early as possible a reversal of this policy of providing new buildings by means of prefabricated huts.

I propose that a very hearty vote of thanks be accorded to Mr. Stillman for his lecture.

MR. E. BERRY WEBBER: Mr. President, ladies and gentlemen, it is also a very great pleasure to me to second this vote of thanks.

There are one or two points I should like to mention. It is manifest how much these modern schools we have been shown have changed from the old type, but one has to remember to get a touch of "humanism." That point was brought home to me when I was showing a lay friend certain illustrations of this type of modern school. I asked him what impression the illustrations gave him. He said: "To tell you quite frankly, they all look like cucumber frames!" That sounds rather scathing, but I do feel that from a layman's point of view it may well be so. Some of them do tend to give you the impression that tropical plants are kept in them. I had considerable difficulty in convincing him that such things as daylight and hygiene were necessary. He kept talking about atmosphere, and so on. That emphasises the point Mr. Stillman made about planting in the grounds of the school and planning the layout with such matters in mind. "Atmosphere" makes all the difference in the world to school children. I have seen many of these new schools erected without any attempt to enhance their rather appalling surroundings. As planting takes so long to mature, authorities, while getting their plans out, might well get on with this job in the meantime. You cannot put a school on a virgin site and expect it to be properly landscaped and attractive as soon as it is built.

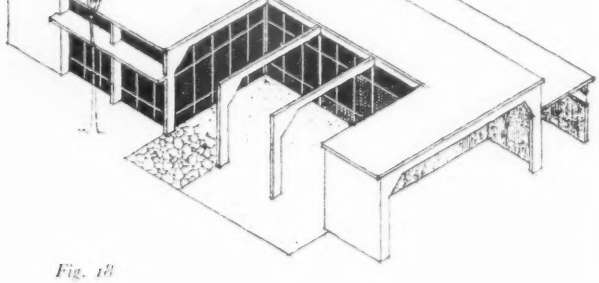


Fig. 18

This is not the first time in this country that we have seen a short-term policy which is really a short-sighted policy. (I will not deviate into the realms of housing.) With regard to these huts, I have sat on the same committee as Mr. Stillman and we hold a healthy diversity of views, but on this point we are at one, namely that the present policy of the Government in putting up these wretched huts when with foresight we could get on almost as quickly with more suitable buildings, is a policy we should do our utmost to stop. I feel that a good deal of effort is called for by us, and I hope that you who are not members of this Institute in your own interests will try to support opposition to this policy.

MR. O. P. MILNE: Mr. President, ladies and gentlemen. We have listened to an extremely interesting discourse from Mr. Stillman as to schools, but evidently he does not know what policy he is to pursue. We talk about environment being important and so on. Sir Robert Wood talked about that here on a previous occasion. The Ministry of Education has paid lip-service to this ideal but it now requires us to build shacks and huts as schools all over the country. If this is to be done our actions entirely belie our words and our sentiments. We do not seem to let the winds of the world, as the late Ambassador of the United States used to say, ventilate our brains. Nobody faces up to how far what is desirable can be accomplished. Mr. Stillman does not in the least believe that temporary hutting can satisfy or solve the school problem. He sees the extraordinary size of his problem, but he does not want his sub-standard huts; he wants permanent buildings. But nobody gets up and says to the Minister: "We certainly want the school-leaving age raised and we want all children in the best possible schools, but it can only be done if you give us time." If we face up to the problem in that way, we can get on in an orderly manner, instead of being hurried, when we shall find that we have created for ourselves exactly the same troubles as were created in the time of the industrial revolution. Then things were done in a frightful hurry. It is largely because building was badly and hastily done, necessitated by the rapid drift of people into the towns, that we have a legacy of the unseemly work of that period to which Mr. Stillman has referred.

MR. W. GRIFFITHS (National Union of Teachers): Mr. President, ladies and gentlemen. I hope that after hearing the last speaker you will not think that the school-leaving age has been raised hurriedly in this country. If we are still going to advocate a leisurely raising of the school-leaving age, then there are certain results which must accrue in our national economy. We want the school-leaving age raised because we are far behind such nations as the United States in the length of the school life of the child. Consequently, I would say that there is something to be said for the hut policy. There will be people defending the huts. We had a promise after the last war of an improvement in school conditions and we did not take advantage of it quickly, so that we lost it for a quarter of a century. Therefore there will be people who will welcome huts. However much we dislike huts and however poor they are, they are an improvement on many schools built during the industrial revolution.

MR. H. V. LOBB: I think it is rather appropriate that I should follow the last speaker, because I can confront his remarks by noting an experience of my own. A Hertfordshire church school was destroyed by a flying bomb in October 1944. I was asked to design and rebuild the classrooms in prefabricated huts. I was told the huts to use, namely, the 24 ft. span which Mr. Stillman has described this evening. Realising the folly of this decision, I prepared an alternative scheme

for a steel frame structure very much on the lines which Mr. Stillman has explained, and I got out the comparative man-hour figures for the temporary huts and the steel frame structure. It took me four months to persuade the Ministry of Education to proceed with the steel frame buildings. I am pleased to say, this is now three-quarters complete, and will be finished in under the time that it took me to get the approval of the Ministry of Education; that is, under four months; and it will result in a saving of something like 1,780 man-hours over the scheme of temporary huts.

In addition, I think there is a very important point which Mr. Stillman has not brought out, namely, that this form of construction calls for a type of labour which is not in short supply at the moment and which is not generally used for putting up houses. Therefore, this labour can be used on building permanent schools.

Mr. P. J. Waldram: The author of the paper is to be congratulated on having brought out the difficulties raised by Regulations 39 and 40 with reference to daylight. They are very important, having caused a complete reversal of the policy of the Ministry of Education, a reversal which may prove to be not only fantastically extravagant, but quite useless.

In the early days of the study of daylight, as soon as photometers were improved to measure its intensities, school buildings were the first to be investigated. Measurements during 1913 and 1914 in schools in different parts of the country ascertained that in the typical modern classroom of that period, about twenty feet deep and lit by generously wide high windows facing into large playgrounds, the desks furthest from the window wall had a daylight factor of about 0.5 per cent. When the report was published, it was found that after making due allowance for the difference between British and Continental units of measurement, that figure was precisely the same as the value specified in the official regulations on the Continent for Government schools. It stood unquestioned and unaltered until the beginning of the war as the recognised minimum of really ample natural lighting.

During the war, the Building Research Station made an investigation for a D.S.I.R. Committee on lighting, and discovered that skylights or toplights gave ten times the lighting capacity of side lighting by windows. This was apparently regarded as a new discovery, although it had long been known to those interested in daylight before the war. The Report (Post-War Building Studies No. 12, H.M.S.O.) states that the Committee, having ascertained that the eyesight of children deteriorated during school years, recommended that the pre-war standard requirements of school classrooms should be multiplied by ten by bringing the minimum up to 5 per cent. in place of 0.5 per cent. A point which seems to have been completely overlooked is that, although in a typical pre-war modern classroom the real intensity of daylight may increase considerably from the back desk to the window wall, perhaps a hundred fold, there appears to be no material difference. If such an obviously well lit interior has 0.5 per cent. on the desk furthest from the windows, I defy anybody to say without an instrument whereabouts the light will come up to five per cent., fifty per cent., or any other figure. You simply cannot see it. When the eye is satisfied that there is no material inadequacy, it is just as unconscious of the differences between 0.5 per cent., 15 per cent. or 50 per cent., as a mariner in a boat drawing six feet is, without sounding apparatus, unconscious of whether he is sailing in water ten fathoms, twenty fathoms or one hunded fathoms deep. Yet merely because top lighting —at one time specifically forbidden by the Board of Education—will give ten times the amount of light given by side lighting, the well-proven pre-war requirement has been multiplied by ten, although you cannot see it when you get it. There is not a single shred of evidence given in the Report from any school doctor, teacher or anybody else, that the eyesight of a single child has ever deteriorated in the slightest degree from the natural lighting in modern classrooms.

The Ministry of Education has not gone all the way with the D.S.I.R., but it has gone far enough to render multi-storey schools impossible. In consequence all schools, whether large or small, and whether situated in open country or in crowded towns, must consist of single storey buildings, and in some cases sprawl over unnecessarily large and expensive sites.

The actual erection of permanent school buildings may be in a state of suspended animation, but sites must be acquired and planned for now. A timely ministerial directive to architects that Regulation 39 should be applied only to single-storey schools, and that designs for multi-storey schools, where such are necessary or desirable, would be considered on their merits, might well save a prodigious waste of public funds.

Mr. S. W. Milburn: Mr. President, there are two questions I should like to put.

I appreciate Mr. Stillman's advanced views with regard to modern lighting, but I suggest that in his plan he is sacrificing the outlook from the classroom. In the old type of plan, one did not get an outlook from three sides, but one did get a good outlook, whereas in the new plan eighty per cent. of the classrooms look out on to a corridor which is closed up.

With regard to the light form of construction envisaged, I would like to ask about the method of sound-proofing.

Mr. Stillman: With regard to the matter of the outlook, those areas are not the sort of small areas which one does get in some types of lay-out; they can be made very pleasant with planting. They have the advantage of being sheltered from the wind, and the great advantage of being quiet. I have to admit that in some cases the plan which I showed, which was really to bring out the various principles of that type, does not give very much of an outlook, but I think that in applying the same principles to a site which I showed in a later plan it would be possible to get that.

With regard to sound insulation, we have been told by the Building Research Station that, to all intents and purposes, a four-and-a-half-inch brick wall will give the sound-proofing needed between classrooms when the noise level is fairly equal. I have tried to get a certain amount of sound insulation by planning. However much one tries to do it structurally, a lot of sound trouble is airborne, and with windows which are open for ventilation it is very difficult to deal with that. One could use four-and-a-half-inch brick. I have used a stud partition using fibre board, and packed with fibre wool. That is not necessarily adequate where it is next door to a music room or a metal workroom, where the noise level is high; but I have found that where the noise level is fairly equal, there is not the trouble or disturbance between classrooms that some people seem to anticipate.

Fig. 19

THE PAINTING OF BUILDINGS

An Exposition of the Ministry of Works Post-War Building Study Report No. 5

By JAMES LAWRANCE

A Paper read at a meeting of the R.I.B.A. Architectural Science Board on Wednesday, 5 December, 1945, at 5.45 p.m.

Introduction by Dr. S. H. Bell on behalf of Dr. Jordan of the Paint Research Station.

Dr. BELL : I should like, first of all, to convey Dr. Jordan's apologies for his absence to-night. I stand before you to-night as a substitute, and, in all modesty, I feel somewhat inferior to the genuine article because Dr. Jordan has a way of saying things which I cannot hope to emulate. I can therefore do no more than to follow the war-time example of the B.B.C. and to say " This is Dr. Jordan's introduction to Mr. Lawrance's paper, and this is Dr. Bell reading it ! "

It is my duty, not so much to introduce Mr. Lawrance as to present an introduction to what Mr. Lawrance is going to say. It is quite unnecessary really, because Mr. Lawrance is quite capable of dealing with this subject in every aspect ; so the fact of my being here at all is a personal tribute to Mr. Lawrance, who I am proud to acknowledge as a master in this borderland between paint and decoration, that is, between paint manufacture and use. I also believe that Mr. Lawrance likes to have me around ; he says it makes him feel more comfortable to have a good fielder of awkward questions upon the platform, and I take that as a compliment.

The paint industry has its origins in the manipulation of natural materials by " rule-of-thumb " methods which have now been rationalised, co-ordinated and further developed as a result of scientific treatment. Nevertheless, the beginning and end of all this paint business was, and still is, craftsmanship, and the architect is well advised to make a sufficient study of paint and painting, so as to appreciate to the full the matters at issue. It is true that the science involved in the study of paint is profound, whether the paint is based on the traditional materials, e.g., the vegetable oils and natural resins, or the newer synthetic materials. Good paint can still be made out of the older and less fanciful materials, and the word " synthetic " is not necessarily a magic charm. There is, however, no need for the architect to feel that he must fully understand all that is involved in bringing together the pigment and the fluid material called the medium in a form suitable for application to a surface and capable of forming a continuous adherent film, having the nature of what is understood by " good paint."

At the other extreme there is nothing more depressing and discouraging to those who believe in good paint than to be greeted by the architect with such words as " My dear fellow, I don't know the first thing about paint," with the added implication that he does not particularly want to. The Study Report published under the auspices of the Ministry of Works is an attempt to set down some of the things which the craftsman intuitively understands, but which so many users of paint to-day do not understand. A good part of the output of the paint industry is being used and is going to be used still more by the amateur decorator, and the Study Report, if it be regarded only as a series of Do's and Don'ts, is unquestionably a useful step forward.

There was an article on the subject of amateur decorating in a recent issue of the *Oil and Colour Trades' Journal*. It said : " Every house in Britain needs paint. Paint is scarce, and good painters are but a glorious few amongst a multitude of ' brush-hands,' and an even greater multitude of householders eager to wield a ' paint brush.' What is to be done about it ? A good paint can be ruined by bad application, but we have to face the fact that many householders and brush-hands will be handling paint." The writer of the article suggests a campaign by the industry, and although he does not mention the Study Report, he does suggest that educational propaganda might be carried on through a series of factual announcements on painting, and the issue of short pamphlets similar to those published by the Minister of Agriculture on how to grow and preserve food.

It occurs to me that the Study Report might be broken up into a number of sections which, when embellished by the kind of material which Mr. Lawrance is going to give in his paper, would form a very desirable series of pamphlets of the type envisaged. I am inclined to think that the Paint Research Station, in conjunction with Mr. Lawrance, might properly consider how this could be done.

There is one aspect of paint and the architect with which Mr. Lawrance is not dealing, but which is of importance. It is the fact that the architect is, in essence, a designer. In all cases the final judgment of his work as appraised by his customer will be based upon the quality of design (in the functional sense), quality of materials and quality of craftsmanship. Collectively these things define " appearance," which goes a long way to determine value. Prospective purchasers, if they do not like the appearance conferred by the paint, may not stop to consider the merits of the design. Moreover, paint is probably the least expensive and most flexible colour medium available, so paint and colour must be one of his major interests, and whether the paint manufacturer is forced to try and engage the interest of the architect, or whether the architect beckons the manufacturer, it is certain that they have to go along together. So, as architects, you may just as well go with understanding and appreciation of one another's functions and qualities and, indeed, difficulties. I commend Mr. Lawrance to you.

MR. JAMES LAWRANCE :

The title of this paper was suggested to me by the secretary of the R.I.B.A. Architectural Science Board, who also intimated that in your studies you are chiefly concerned with fundamental principles, i.e., not merely what should be done but why, and that painting would seem to be best covered by discussing the purposes of paint ; what are the functions of the different constituents of paint and how do they affect its value as a preservative or in use as decoration ? How are they affected by the background materials ? and what are the guiding principles in the choice of materials and conditions of workmanship ?

The word " exposition " has two distinct meanings, the " act of exposing " and " explanation or interpretation." I propose to accept the former, first because, as a member of the committee that produced the study report number 5 (as I propose to call this report throughout this lecture) I cannot admit that this explanatory study needs explaining. Secondly, because I would not be so uncomplimentary as to assume that the architects could not understand it. Yet, in laying open or exhibiting the report, it may be possible to carry things a little farther than has been possible in its limited pages. In order to comply with the valuable suggestions made by your secretary I propose to concentrate on certain important aspects of the study report number 5 without being hampered by the particular sequence in which the various items appear in the report.

The general nature of paint and its functions

Let us first prepare the ground by obtaining a clear conception as to the general nature of paint and the functions we can reasonably expect it to fulfil. A single film of paint as applied by the brush in the hands of a good craftsman may be anything from 36 to 50 mu in thickness (one mu equals one thousandth of a millimetre). Thus a normal four-coat job should not exceed about 200 mu or one-fifth mm. This is about the thickness of a piece of celluloid photographic film.

The chief function of this paint system, particularly when used on exterior work, is to protect the structural material, mainly from attack by moisture. The effects of moisture movements in various materials are well known to you. Systems of seasoning, curing, or drying out of the structural materials are adopted to bring these materials into a state of equilibrium with the normal humidity of the atmosphere.

Unless protected and thus maintained in this state, many of them would fail to remain structurally sound. Stability of fabrication in structural work often rests on the maintenance of its component materials in good condition free from excessive moisture.

Moisture movement affects various materials in different ways. In woodwork the physical changes alone may be enough to cause joints to open and panels to expand : this apart from subsequent possibilities of rot. The disintegrating influence of moisture on certain plasters, cements, stone and bricks is well known. Indeed, the enlivening of certain kinds of chemical activity under moist conditions is an accepted fact. The accelerating effect of moisture on the corrosion of metals is also a matter that forces consideration for the means of protection. All these effects are, of course, well known. They are mentioned here only to complete the picture illustrating the importance of the thin barrier of paint. It will be appreciated that a film of paint is a comparatively delicate membrane which, by and large, functions much more effectively than one might expect from its mathematical proportions. Too often, paint is expected to cure all the troubles generated by water movement. The correct view is that paint will not function properly unless moving moisture in the groundwork is first eradicated. Indeed, it may quite likely accentuate these difficulties by keeping the moisture in. Moisture in itself is generally repellent to oil paint and one can hardly expect paint to protect a surface to which it will not properly adhere.

Some attention has been given to the establishment of tests for the moisture content of various materials in relation to the surrounding atmosphere, so that a correct balance may be ensured prior to the application of paint, and some progress has been made in this direction. The desire to occupy a building as soon as possible and to give it a respectable appearance have often been potent factors in hastening completion while common-sense measures based on the requirements of the situation have too often been abandoned. While on this point it may be well to mention that mere observation may fail to give information as to the state of a surface in regard to moisture. When dry air traverses a damp surface and remains unsaturated, after absorbing moisture from the surface pores, a dry appearance will be maintained which may be quite deceptive. If the surface is painted at this stage trouble may eventually occur due to the imprisonment of moisture which was formerly in the process of invisibly disappearing into a dry atmosphere. Usually the weather changes over twenty-four hours or so will reveal the true state of affairs. I have observed cases in which the surface of woodwork has been maintained in a dry condition to the extent that coatings of stain and size have also given up their moisture content to the dry air, but on being varnished the deeper arrested moisture has percolated into the size coat turning it into a mobile jelly. This has supported the varnish as a very unstable floating film, as easily removable as a wet transfer.

It would appear to be no mean achievement to produce materials which, applied in several coatings to form a composite film of, say, one-fifth of a mm. in thickness, are capable of protecting surfaces for a number of years. Furthermore, to do this, the system itself must, of course, be inherently stable against destructive influences sufficiently to remain intact and effective as a protective film.

Apart from its protective value paint is commonly used because it renders surfaces more fit for cleaning. Many building materials present surfaces of rough texture and tend to hold dirt. Some are absorbent and thus easily contaminated by airborne or moisture-borne dirt. Paint functions partly as a filler and partly as a suction stopper and can be utilised to counteract dirt-carrying tendencies, at the same time presenting a surface that is readily cleaned with common detergents.

In addition, there is the field of decoration, where paint gives scope for controlled colour and texture. At first sight, this may appear to be an entirely separate function quite unrelated to those appertaining to preservation and cleanliness. It is true that paint is used for decorative purposes because it lends itself to such manipulations as are conducive to effective display, i.e., it is one of the best means of "colouring" a surface. We cannot, however, entirely divorce the decorative aspects of paint from the material on which it is applied. For instance, a flat paint of a certain pink hue may be used not only for its decorative quality but also because the flat paint may prove safe on a surface suspected of having a comparatively high moisture content, and a pink may be safer than certain greens or blues on alkali-bearing surfaces. Or, again, the selected colours or treatments may be particularly suitable for certain materials or objects. Samples of bad taste that might be cited are : the graining of iron or lead pipes or baths, imitation marble on wood panelling, or painting stonedressings in Post Office red. We may also pause to note the fact that material that need no preservation or that present ideal cleaning surfaces, such as some of the modern plastics, do not necessarily usurp the functions of paint as decorative materials. We must not overlook the individual preference for certain colours or that a change of colour is frequently desired. Any attempt to perpetuate schemes of decoration by establishing everlasting plastic surfaces will be doomed to failure. This is already clear from the enquiries that are being made as to the best method of painting these plastics.

The psychological aspects of colour in connection with the treatment of factory walls and machinery is now receiving considerable attention and the function of paint as a decorative material is here linked with that appertaining to cleanliness.

This, then, is our picture : a paint system of a total thickness of about one-fifth mm. will function as a protective film, will render surfaces fit for periodical cleaning and will give decorative effects. To fulfil these requirements the surface must be suitable and fit for the reception of paint, the paint must be applied by capable craftsmen, the weather is important and painting operations should be suspended during adverse conditions.

The paint must adhere well to the surface and conform to such movements in the material as may be normally generated by changes of heat or moisture. It must fill the pores and build up a uniform level surface. It must be sufficiently resistant to the weather to ensure inherent stability as well as protective properties. It must produce a surface having the desired characteristics in regard to gloss, opacity, etc. It must stand a reasonable amount of abrasion, handling and cleaning. It must be capable of application and of such manipulations as are necessary to provide a serviceable and presentable finish. Furthermore, all coats in the paint system must be mutually compatible. This is a fairly formidable list, but all these points must be kept in mind when formulating a series of paints in a paint system, which, by the way, should be considered as a whole and not as a series of separate coats used independently and without due regard to other coats in the system.

The performance of paint will be affected by the condition of the material to be painted, weather conditions during painting operations, the ingredients of the paint and their correct incorporation, uniformity of application, and maintenance of proper consistency and other characteristics of the paint during storage and application.

It will be obvious from the above that the formulation of a paint system will mainly depend on the particular material to be painted, but certain modifications may have to be made to accommodate methods of application, whether by brushing, spraying, dipping, etc. Any special considerations appertaining to conditions after application, such as the risks of condensation, excessive handling, etc., will require study. The question of accessibility will be important where maintenance costs call for special consideration. For instance, one might choose distemper in preference to paint in a given case from considerations of general fitness or economy, but may decide to use paint on a similar surface in a very inaccessible position to save the necessity of comparatively frequent renovations and the attendant necessity of difficult scaffolding. Finally, decorative quality of finish will need consideration and formulation must provide for the required texture and colour. Many of these requirements are mentioned in the study report No. 5, but they are laid out here in detail as a fairly comprehensive list and as an exposition that might well engender a certain respect for paint.

The characteristics of paint-forming materials

The subject has thus been prepared for a further probing into the question of the paint itself. Each coat in a system has its own peculiar functions which will be considered separately, but first some general observations appertaining to the characteristics of certain paint-forming materials may be of interest. The selection of any particular pigment for a given purpose, though mainly dependent on its characteristics, cannot be made without reference to the medium or vehicle in which it is to be used. The mutual behaviour of pigment and media towards each other must be considered. To give an example, linseed oil is known to be an excellent paint vehicle : antimony oxide and titanium oxide have excellent qualities as pigments. It has been found that these pigments when mixed with media founded on linseed oil make worthy paints for interior use but are apt to show early signs of chalking when exposed to exterior conditions. One could not soundly argue from this that titanium and antimony pigments are unsuitable for exterior use or that linseed oil is an unsuitable medium for paints exposed to the weather. Linseed oil with white lead has proved its value for this purpose and certain of the so-called synthetic resins

notably the modified alkyd resins, combined with titanium and antimony pigments, have shown exceptionally good weather resistance. Even lithopone, which rapidly chalks when used with linseed oil, will give tolerably good results with an alkyd medium. It is not correct to assume that full reliance can be placed on the medium alone as the protecting agent in paints, or that given a good medium no significance attaches to the pigment except as a colouring agent. The influence of the pigment on the structure of the film is of considerable importance, as also is the correct balance between pigment and medium. Pigments may impart toughness, hardness, opacity, working qualities, stability or may inhibit corrosion. Adversely, they may cause a paint to crack, chalk, work badly or stimulate corrosion. The balance between pigment and medium may regulate the manner in which final breakdown of the film occurs. Under-pigmentation may cause the eventual breakdown to proceed by stages of cracking or peeling, whereas over-pigmented films may break down by chalking. This question of final breakdown is important because preparation for re-painting a compact chalky surface is comparatively simple, but grounds that are cracked, blistered or peeling generally call for entire removal, as no preparation will render them worthy as a ground for re-painting. Pigments might be said to have a cementing value in paint and some are so shaped physically that they offer primary support even in defiance of a fairly poor medium. Certain solutions of resin without any plasticiser in the nature of oil would quickly perish on exterior work, but if pigmented with aluminium powder they will give a very good performance. Powdered mica will also step up the performance of such media. Their scale or leaf-like structure undoubtedly acts as a mechanical tie. Light has a destructive influence on transparent media and this also may be mitigated by certain types of pigment. Thus, when formulating paints, we have to consider the characteristics of both the pigment and the media. Both may have desirable and undesirable properties and it often becomes a matter of combining these materials so that faults are mutually counteracted and a compromise reached with a view to giving generally good service. For instance, one pigment may be very opaque but cause brittleness in the film: another may be poor in opacity but may tend to generate elasticity when combined with the medium. A mixture of the two may give ample opacity and sufficient elasticity. Again, lithopone has good opacity but tends to rob a paint film of its gloss, whereas zinc oxide is lower in opacity but tends to promote gloss in conjunction with certain types of media. A mixture of the two will give a paint of satisfactory opacity and reasonable gloss. The same kind of adjustment is made in respect of various media. It will be appreciated from all this that any promiscuous thinning or extending of paints by painting contractors could entirely upset the balance so carefully poised by the paint manufacturer.

Priming paints

Coming now from the general to the particular, let us examine the question of priming paints. Priming is the name given to the foundation coat. It may be mentioned, however, that certain plasters and wall boards may require a preparatory coat of something other than paint and this is often referred to as a sealer. Broadly speaking it may be said that priming is a paint and a sealer is a special preparation outside of the normal paint composition, but there is no hard and fast line between the two. The particular functions of the primings will vary according to the nature of the material to be treated, but in all cases it is necessary that they shall be firmly adherent to the surface and present a sound foundation to which subsequent coats will properly adhere. This means that for absorbent surfaces the primer should be so formulated that it remains partly on the surface after satisfying the suction of the material, thus giving a key to the following coat of paint. If the whole of the primer is absorbed and allowed to become rock hard further coats may not adhere thoroughly. I have frequently found on examining blisters thrown up from painted woodwork that the priming coat has been firm in the wood but evidently formed no key for the subsequent coats. The proportions of oily or resinous matter and of volatile solvents are generally regulated to meet the requirements in regard to suction. Surfaces capable of great absorption, such as soft woods, should be primed with paint containing a large proportion of oil. Hardwoods offering less suction will require a primer containing more turpentine or white spirit and this can be made thinner to aid penetration. The penetration of paint into surfaces will vary according to the nature of the material applied. Some of the modern priming paints depend on adhesion rather than penetration and do not strike so deeply into the surface as the older types of oil primer. They eliminate the risk of total absorption which is probably a greater fault than weak penetration. Further, there is the advantage that they preserve the priming as a comparatively uniform film which will harden off as such. Oil primings penetrate more deeply and thus lose identity as a film and may hold residual solvents and oily matter in a semi-dried form owing to the feeble progress of oxidation in such circumstances. This difficulty has been appreciated and largely overcome by the incorporation of red lead in oil primers. This exerts its influence as a drier irrespective of the external oxygen supply and thus dries the primer right through into the wood. White lead is usually incorporated in oil priming paint for woodwork. It is less affected by stray moisture than some pigments and is favourable to the retention of sufficient elasticity to meet the usual weathering stresses.

Primers for woodwork to be used exclusively on interior work are frequently made from leadless pigments. Unless such work can be properly segregated, however (as may be possible on certain prefabricated work), it is perhaps advisable to adhere to white lead. Obviously much of the woodwork employed in buildings will eventually be exposed to both exterior and interior conditions on opposite sides respectively. It may be mentioned, incidentally, that red lead imparts sufficient colour to the paint to assist in masking the somewhat variegated colour and grain of the wood, thus rendering a more uniform colour throughout the system of coats. So much for the traditional wood priming which should be "something more than something pink" (I offer this as a free slogan).

Some of the modern synthetic media have characteristics which so far meet the requirements as to make the need for white and red lead less specific, and suitable types combine quite effectively with other white pigments to form good primers of the adhesive type. Aluminium powder and other laminated pigments are sometimes used in this combination instead of the usual white pigments. They render films of marked continuity which are relatively impervious, but some caution may be necessary in the use of such paints when any risk of imprisoned moisture exists, because they would yield only by flaking or blistering away from the surface. If the technique of an adhesive type of primer could be brought to perfection one advantage would be that it could be more universally used. It would be effective on absorbent and non-absorbent surfaces alike, providing always that they were free from excessive moisture.

The priming of steelwork and ironwork

We come now to the priming of steelwork. The craftsman painter is perhaps more interested in the treatment of wood and plaster than of steelwork: the reason is not far to seek. Woodwork and plaster are nearly always originally presented in an unpainted condition. Generally speaking, it is possible for the craftsman to proceed in a systematic way and to produce a well-painted surface built on undercoats which have been mixed in accordance with an intelligent knowledge of the requirements. Ironwork presents a somewhat different proposition. It reaches the painter in all sorts of conditions. It has, perhaps, started to corrode before it gets on the job. It has, very likely, been coated with something red; something, perhaps, that stimulates corrosion. The amount of paint sold annually to engineering firms for the purpose of first coating ironwork would probably give house painters a surprise. Much of this material in the past has been very poor and merely made the iron look presentable during its journey from the works to the job. Too often it could have no claim as a preservative. The great danger is that unless such paint is removed it interferes with the value of good paint subsequently applied. Fortunately, an increasing number of structural engineers are giving some thought to the question of sound protection of their products and, when this is the case, specifications are usually planned on very sound and strict lines.

The main problems are the elimination of mill scale and the prevention of rust pitting prior to painting. Much research has been carried out on these problems and various physical and chemical treatments have been proposed with a view to securing a paintable surface. Some of these processes are applicable only to factory work and fail to be universally acceptable as treatments for steelwork because they are not practicable for certain situations on site. So far as the painter is concerned, all he can do is to clean the ironwork as well as possible with hammers, files, wire brushes and the like. Priming made from red lead and linseed oil is in common use and has frequently been rated very high in exposure tests carried out in order to assess the value of different types. The use of certain pigments inhibitive to rust such as suitable qualities of zinc chromate, oxychromium green and zinc dust are advocated by some engineers and appear to be worthy of attention. There has been a considerable amount of research on the subject during the last few years. The Paint Research Station published a bulletin (No. 16) on "The Preservation of Iron and Steel by means of Paint," which contains much valuable information, and a publication by the Iron and Steel Institute, "Protective Painting of Structural Steel," gives data based on numerous tests and some conclusions derived therefrom. The items in the study report

No. 5 relating to the painting of steelwork (Pars. 100, 118, 135, 150) summarise most of the general information on the subject, but perhaps the real solution of the problem of permanently protecting steelwork lies more in the preparation for painting than in the formulation of the priming, important as this is.

There are one or two points which will bear notice in this connection. Structural steel painted in the factory is often left in the open, perhaps in contact with muddy soils, for long periods. It sometimes suffers severe abrasion from hoisting chains and other tackle, laying bare various edges and patches. Damage done in this way needs careful attention. If these places are treated, perhaps along with the rivet heads and bolt heads separately from the general surface, the painter's attention is more likely to be concentrated on such parts and greater care exercised in their treatment. Rust often commences along arrises because paint recedes from edges of this kind, leaving the film comparatively weak. This is often noticeable on steel casements or any structures having sharp edges. Rounded members are more likely to support a uniform film of paint which will therefore last longer.

Corrugated ironwork usually shows rusting first on the convex surfaces. While it may be true that such surfaces catch the weather more critically than the hollows and thus suffer first, it is more likely that the premature failure of paint on the convexed surfaces is the main cause. This arises because in the act of brushing the paint on, the hollows naturally receive more paint than the convex tops. If these convex surfaces were primed first, followed by a general coat of priming, the extra time involved would be worth while.

In some situations, black varnishes are used to protect ironwork. These may be made from bitumen or from coal tar pitch as a base. Whilst bitumen is often regarded as a finer grade of material than coal pitch, long-run tests sometimes show the pitch off to advantage. Extensive surface cracking often appears on pitch coatings, but it is confined to the outer film and does not strike through the substance of the whole coat. Bitumen gives a more uniform appearance but tends to powder off in some cases unless suftably plasticised. There are many types of black varnish, however, and no doubt many of the bitumen solutions are quite sound for certain work. The matter is mentioned here to draw attention to the possibilities of the cheaper materials for the treatment of steelwork in certain situations where appearance is of no great consequence. Black varnishes do not form worthy grounds for paint and should not be used as primers in the ordinary sense. Sometimes black varnish is preceded by a coat of red lead primer which should be applied well beforehand, otherwise resoftening of the primer is likely to occur when the black is applied.

Painting of plasters

In view of the lecture which Mr. Llewellyn will be giving at a later date on the subject of painting plasters, I propose to say little about primers for these materials. I am sure that Mr. Llewellyn will deal with the subject very ably. There are, however, certain inherent characteristics in this type of surface that have an interesting bearing on the general question of suiting a paint to its particular job. There are two distinct types of paint film : one which is elastic, continuous and more or less impervious, and the other an orderly assembly of particles spread out to form a coating of regular thickness in the nature of a porous membrane. We might liken them respectively to an indiarubber sheet and a stretch of Cumberland turf. If it were possible to stretch the Cumberland turf, the blades of grass would merely stand farther apart whilst a stretched rubber sheet would still form a continuous layer. Be it noted also that the turf allows moisture to escape from the ground beneath whilst the rubber sheet entirely prevents such escape and is used as a ground sheet for that reason. Cement and plaster surfaces are liable to contain moving moisture for a considerable period after rendering, and being comparatively rigid in structure do not call for highly elastic coatings. Therefore, there is often an advantage in utilising the porous types of film which are gummy rather than oily and have plasticity rather than elasticity. There are a number of materials that form this kind of film and some of them possess the advantage that they are resistant to alkalis. Provided that good adhesion can be secured, such materials make satisfactory paints for plasters and cements, though certain types are not suitable for subsequent recoating with ordinary paints. Some of them form reversible films; that is to say, they are readily redissolved in volatile solvents of a similar nature to that with which they were originally dissolved. Whilst this may not be of any consequence when application is made by spraying, some care is called for if subsequent coats are brushed on ; otherwise the undercoat may be disturbed. Fairly rapid application overcomes the difficulty.

Many of the emulsion paints dry to porous films and there are a number of emulsifiable materials that are resistant to alkaline action. Most of the washable distempers fall into the category of emulsion paints. Ordinary size distemper or " Soft " distemper, as it is appropriately called in the study report, forms a porous film and is often used as a temporary coating on moisture-bearing surfaces.

Slight moisture movement in surfaces can sometimes be prevented by securing sufficient penetration of the priming or sealer so that movement is checked behind the face of the material painted. Unpigmented boiled oil or alkali-resisting varnishes have been used in this way on asbestos cement sheeting and are applicable in cases where water dispersion can operate in directions other than through the face of the material.

Some of the wallboards call for special sealing treatment b[illegible], apart from overcoming suction, the fibres of the material nee[illegible] setting treatment to avoid irregular swelling and consequent ble[illegible] in the surface finish. Whilst these defects would not be una[illegible] prominent on walls finished in flat paint, they seriously interfere with the production of a good enamelled finish. Suitable treatment has been devised but it is highly technical and need not be dealt with in detail here. In the main, it is a matter of regulating the sealer so that it is of such a nature that it is not too freely absorbed. Materials are incorporated that increase the rigidity of the fibres and render them immobile against the intrusion of fluids from the superimposed paints. Successful results also depend on the subsequent filling and preparation for the finishing coats of enamel.

Undercoatings

Let us pass on to the undercoatings. The main functions of the undercoatings in a system of paint are those appertaining to the filling properties, opacity, colour and support to the finishing coats. Undercoatings are usually highly pigmented and thus level up the minor irregularities of the surface. It will be obvious that the function of a paint as a filler will be quite useless unless the paint is properly applied. Bad craftsmanship would result in a crop of brush marks making the surface more irregular than that of the original material painted. In brushwork, opacity is not increased in proportion to the thickness of the coat because the channels left by the brush mark the weakest parts of the film. As an analogy one might cite the effects of fine and coarse combing or fine and coarse hatching with a pen ; the finer will always appear to be the more solid. Paint films have to stand certain stresses which they cannot resist evenly if the thickness of the film varies violently along the paths of the brush marks. Therefore, early breakdown is more likely to occur if paint is carelessly applied in this respect. In order that comparatively heavy coats can be applied without suffering from these faults in brushwork, materials are embodied in some undercoatings that impart " Flow," the brush marks thus becoming lost in the general merging that takes place immediately after application (like the flow in an enamel). The same kind of property is imparted to flat wall paints and flat enamels to render a pleasing matt surface. Some caution is necessary as to the application of the flowing types of undercoating on previously painted work. There is a tendency for painters to spread this kind of paint without too much brushwork. The crossing and re-crossing that takes place in the normal manipulations are often abandoned with a consequent loss of adhesion. The act of rubbing a highly pigmented paint with plenty of frictional application on to a surface secures intimate contact which is not easily disturbed. A coat of the flowing type, spread lightly over the surface, may fail to do this. It would therefore appear to be safer, when repainting old work, to let the undercoating be of the non-flowing, highly pigmented type and to put the necessary craftsmanship into its application. After this, the flowing type will be satisfactory because its attachment to the fresh undercoat is secured by compatibility, aided by the readiness of the first coat to yield to the slight solvent action of the second.

Some undercoatings retain their media more tenaciously than others. If an undercoating too readily loses its vehicle to the ground on which it is applied it may be reduced eventually to a powdery layer incapable of holding the finishing coat. This may be regulated by the type of pigment used or by the kind of medium adopted, but it is a subject that is worth more study than it has hitherto received. When cases of peeling or blistering are examined, it is frequently found that the supporting undercoating lacks cohesion and may be deemed to be more at fault than the finishing coat which exhibits the failure. The rather common conception that, as the undercoating is normally covered up by a finishing coat, its composition is of minor importance is quite erroneous. It is most essential that in addition to providing opacity and filling properties, an undercoating must be properly designed to give full support to the final coat. The strong affinity of white lead for oil has no doubt been an important factor in prompting some manufacturers to retain it in exterior undercoatings although advocating the more opaque pigments such as titanium oxide and lithopone for interior work.

The apparent opacity of an undercoat will not depend solely on the particular pigments used in its composition. For instance, an undercoating having a low oil or gum content and a high volatile content will appear to be much more opaque when dry than a similar pigment composition carried in a more oily vehicle. This may give rise to some deception and the importance of regarding the point rests on the fact that this false opacity will fall when the glossy finishing coat is subsequently applied. The true opacity of an undercoat is revealed only when its contribution in this respect is measured by final results. A coat of whiting in weak size will cover fairly solidly on a black board, but if subsequently varnished the masking effect of the white will practically disappear.

A good undercoating should cut down cleanly with glasspaper when dry without clogging, as this method of obtaining a fine even surface is the normal practice for good work. Any clogging and consequent tearing of the film can do damage which is difficult to rectify.

Filling compositions are sometimes used for perfecting surfaces. Those of the water-paint type are easily spread with a filling knife and easily rubbed down with abrasive paper. It is usual to follow with a sealer coat and this virtually turns the filler into something resembling oil paint. Oil fillers, in which the filling pigment is mixed with rubbing varnish or gold size thinned with white spirit, perhaps call for more laborious handling but are regarded as preferable by many of the older craftsmen. With the progress that has been made with the flowing types of undercoats and bodied finishes the practice of filling is falling into disuse to a large extent.

Finishing coats

In finishing glossy coats we look for the properties of flow, opacity, elasticity and durability. Heat-treated oils combined with natural or synthetic resins are now largely used for making hard gloss finishing paints and these materials are capable of producing excellent results. The main difference between the old type of varnish medium used in hard gloss paints and the modern alkyd (synthetic) types is that the former consists of a natural resin (after cooking) dispersed in linseed oil or other natural oil, while the latter is often formed as one chemical entity. It is possible, in the case of natural gum-oil varnishes, that some form of honeycomb structure is set up on drying. The walls of the honeycomb being formed of a mixture of gum and oil, the pores or capillary tubes may become filled with almost pure oil. In course of time this may sweat out, thus leaving the film in a comparatively brittle state. Furthermore, attack by light and air might be expected to be less rapid on a single phase structure than one of double phase. Whilst the synthetic types have merited their established position among the paint-making materials it is too early to assume that the natural oil-resin types have been superseded : in fact many excellent paints are still produced from the traditional natural materials, but further developments in the use of synthetic materials will be well worth watching.

Careful selection of pigments is necessary for the production of permanent and durable colours. It should be noted that the final effect of certain lakes and other semi-transparent colours will depend very largely on the colour of the undercoating which should be properly selected so as to correctly lead up to the finishing colour. Red oxide, for instance, would not enable a signal red applied over it to exhibit its true colour ; a bright pink would make a more suitable undercoating. It may also be pointed out that certain colours that are tolerably fast to light in themselves will often fail when reduced to a tint with white pigments. It cannot be assumed that because a certain blue or red gives permanent results that light tints of the same pigments will be safe.

A word might also be said about the drying propensities of the different types of hard gloss paint. One based purely on linseed oil may need some 16 or 18 hours for drying if serviceable elasticity is to be maintained, but some of the synthetic varnishes will give durable elasticity with a drying time of under six hours. There was a time when such speed of drying would have been enough to condemn a paint so far as adoption for exterior use was concerned, but this theory could not hold in present circumstances and in view of the wider range of materials now used.

Some special paints

Before leaving the subject of materials mention may be made of such special paints as fungicidal paints, fire resistant paints, or more correctly fire retardant paints, luminous paints and stains. Fungicidal paints, resistant to attack by fungi, usually depend on the incorporation of poisonous ingredients such as mercury salts. Before application, the surface should be freed from fungoid growths by washing in water to which a suitable fungicide has been added. Shirlan N.A. or Santobrite used in the proportions of 1 lb. to 10 gallons of water have been recommended. Both of these materials require to be used with caution as they are poisonous. The use of naphtha as a thinner for the paint adds to its effectiveness in some cases.

Fire retardant paints provide some measure of protection against ignition and spread of flames. Silicate paints, washable distemper and flat oil paints all have a certain amount of protective value in this respect. The addition of such substances as borax, chlorinated rubber and magnesium phosphate to paint are said to cause the emanation of gases that tend to staunch fire, but some of the simpler compositions previously mentioned have been found quite effective so far as flame spread is concerned. This is probably the more important aspect in view of sheeting materials used in modern buildings.

Luminous paints are occasionally used to define objects in the dark. Special precautions are necessary to ensure that surfaces under treatment are dry and free from lead compounds. Special undercoats should be used as directed by the manufacturers. The application of luminous paint is really a specialist's job as there are many factors that lead to failure unless correct procedure is strictly followed. There has been considerable development of late years in the type of florescent paint activated by the so-called black light (ultra violet).

It is not possible to deal extensively with the subject of stains here, but it may be mentioned that in preparing woodwork for staining, glass-papering with the grain instead of angularly across it is advisable and gives cleaner results in staining. Bitumen compounds are often used as stains but they are not always satisfactory, particularly if the work is to be varnished or if subsequent painting is contemplated.

The application of paints

Now in regard to the application of paints, I have heard many a craftsman say that the quality of painting fifty years ago was no worse and perhaps better than it is to-day. In a sense there may be some truth in this, if we close our eyes to the question of speed, craftsmanship and the characteristics of the surfaces painted. Good, old stack white lead, tanked linseed oil and American turpentine applied to well-seasoned woodwork, and perhaps varnished with well matured Kauri varnish (tanked perhaps a couple of years before use) stood well ; very well. The time factor was not important in those days ; plenty of time was allowed between each coat, and it was common practice to apply at least five coats on exterior work.

To-day's background is different, only one coat in a day is almost frowned upon ; speed is an essential factor. Mass production of prefabricated parts of steel, wood or concrete have called, either for some speedy method of preparation for the reception of paint, or for some coating material, borrowing the name of paint for the sake of respectability, in order to hide the defects. Some of the surfaces thus presented for painting set the paint a formidable task, and many of the modern developments in paint materials have been conceived as a result of the extra demands made on them under these circumstances.

So far as oil paints are concerned, the old adage that it is bettter to put one coat on in two applications than two coats in one is still true. Well brushed out, thin coats produce more uniform and more durable surfaces than heavy coats. At the same time, it must be acknowledged that developments have been made in the production of paint media and that some types now produced dry more uniformly throughout even when applied more heavily than would have been prudent with straight oil paints. It is even possible now to apply a coat of paint over another one before it is dry, but this is a matter of special formulation and is not a common property of modern paints.

Paint compositions have had to be modified to suit new methods of application, particularly spraying, so far as the painting of buildings is concerned. More adhesive types of media have been utilised, because spraying methods fail to secure the same kind of adhesion that is gained by brushing the paint into the surface, particularly in regard to primers. This may be partially due to occluded air on the surface and partly due to the fact that the paint arrives at the surface in a somewhat thicker state than when ejected from the nozzle of the gun, by losing some of its volatile content on the way. To overcome this weakness, a somewhat recent modification of the process of application has been evolved ; that of spraying the paint on and then immediately brushing it into the surface and laying off. This saves time in spreading the paint and is thus a compromise between spray-work and brush-work. The difficulty here is to ensure that the work is properly carried out, as there may be a serious temptation to skip the brushing, and such omission might easily go undetected. Although these developments have widened the scope for applying paint by

spray it is not to be expected that the method is applicable to all kinds of painting everywhere. For large areas, or for jobs that can be organised on mass production lines, the adoption of the spray gun has enormously increased.

Distemper can be very efficiently sprayed. The painter has no brush marks to worry about, and unless he appreciates that good distempering is something more than merely securing opacity, he will be liable to thin his distemper too far. Many jobs have failed to give satisfaction because the painter has imagined that all he has to do is to apply very thin material and hold the gun in successive positions long enough to allow just sufficient piling of the distemper to gain the required opacity. The result of over-thinning is that the binder is so diluted that it is absorbed too readily into the wall surface, and the distemper is robbed of its proper content. Even a first-class properly constituted distemper will fail if the binder is washed out in this way. The distemper should be mixed to approximately the same consistency as for brushing, or alternatively, some compensation should be made for absorption loss by thinning with the maker's petrifying liquid, or special thinners, as the case may be. This is an important matter which must be considered in relation to the nature of the surface, and the painter must see that his procedure is such that the distemper will retain enough of its binding material to give it a fast-bound washable surface. If the surface presents too much suction to ensure this, a preparatory coat of sealer should be given. In brushwork this becomes a necessity from the manipulative point of view, but as it does not present the same manipulative difficulty when spraying, the danger of over-absorption is sometimes overlooked.

Coupled with research as a means of discovering methods of improving the performance of paints, investigations are constantly being made as to the best methods of evaluating them. Considerable ingenuity has been shown in this direction, a strong lead being given by the Paint Research Association in the establishment of certain standard methods of testing.

Tests

Physical laboratory tests for ascertaining the characteristics of paint are made with two main objects in view :—

(1) To forecast practical performance in use : There are a number of physical tests that give an indication as to how paint may be expected to behave. It cannot be claimed that there is always a rigid relation between performance under laboratory tests and subsequent performance on the job, but such tests give comparative data for a range of samples on which to assess their probable results in service.

(2) To define terms by making them the subject of facts instead of opinions : Specifications are sometimes ambiguous ; to give an example from a clause still in use in connection with a " hard dry " test :—" No sign of stickiness to a thumb shall be apparent." No definite line is given as to where stickiness ceases to exist. Surely, all good gloss paints are permanently sticky to a slight degree compared with, say, glass. Physical tests are made with the object of defining such points. The aim when specifying a test is to eliminate, as far as possible, variable factors which may have a distorting influence on the results of that particular test. For instance, it is necessary to fix the thickness of film, the temperature and the type of surface when specifying " drying " test.

Some of the tests give no immediate evaluation. For instance, those appertaining to staining power, sediment, coarse particles, hiding power, etc. Others, whilst giving what may appear at first sight to be fixed data, should be regarded with caution, because they do not record changing characteristics in a manner that gives a clear indication as to the rate of change. Tests for drying, hardening, flexibility and gloss are of this kind. The comparative flexibility of paint may not remain constant over a period. A paint more flexible after seven days than another sample may be less flexible after a month. Certain paints that dry within a given time, when freshly made, may become quicker or slower if stored for a time before use. Tests made under accelerated influences do not always give the same results as actual happenings under exposure. To subject paints to regularly imposed influences in periodic succession may give some forecast as to their probable behaviour, but if, in actual practice, the paint has to stand constant or prolonged rain or frost, the results may not be as expected.

Before attaching too much importance to any particular test, it must be considered together with other tests and an overall impression from the behaviour of the paint under several different tests should be aimed at. For instance, if a paint behaves comparatively well under an accelerated weathering test and also passes the bend test without cracking, stands a good weight in the scratch test, dries well, and shows no corrosion after, say, seven days in the humidity chamber at forty degrees centigrade, it would be safe to assume that it would probably give reliable service.

A suitable grouping of tests should be decided upon, in view of the particular requirements in each case. The following examples will illustrate this :—

Exterior Glossy Paint
Drying test (thumb test).
Scratch test.
Gloss (comparative)
Weathering (accelerated or exposure).
Bend test.
Corrosion (humidity chamber).

Quick Drying Machinery Paint
Drying test (weighted steel ball).
Hardness (impact).
Bend test.
Adhesion.

Interior White Undercoating
Hiding power.
Spreading power.
Sediment.
Drying.
Coarse particles.

Enamel
Gloss.
Flow.
Brushing quality.
Adhesion.
Flexibility.
Hardness (rolling ball).

Anti-corrosive Paint
Porosity.
Corrosion (humidity chamber).
Weathering.
Adhesion (bend).

The reactions to each test are recorded, and the value of the paint assessed on the full record. A paint may have excellent characteristics in certain directions, such as flow and elasticity, but would be quite useless if it was too stiff to apply, or tardy in drying. By close observation a test can give a great deal of information of a valuable kind, and while they may not be infallible, risks of failure may be considerably reduced if the findings are applied in a practical way to the business of estimating results.

One could go on talking for hours about the " pros and cons " of painting, but I have endeavoured to restrict my remarks to essentials. I hope that I have been successful in presenting a picture giving some insight into the problems involved, even if my remarks have excited some surprise as to why paint lasts as long as it does.

DISCUSSION

DR. BELL : There are three threads running through the Paper. One of them is the proper selection of materials, and in this connection the author has emphasised the wholeness of the paint system within itself and in relation to the surface. Another is the suitability of the painting material for the job in hand and the necessity for proper preparation of the surface and careful application. That introduces the idea of design in which you, as architects, are particularly interested.

Mr. Lawrance has mentioned mica, aluminium powder and pigments which have special effects. Every pigment has a range of particle shape and size, and that can be used to have a structural and reinforcing effect as has the aggregate in concrete or steel in ferro-crete, affecting the strength and utility of the film. We are learning more about the shape and size of the particles through the invention of the electro-microscope, which is now being used to study pigments and extenders.

On the question of suitability of materials I should like to say something about luminous paints. All sorts of suggestions have been made about painting whole rooms with luminous paints for illumination

purposes, but there are technical and price considerations which make these suggestions rather fanciful. Luminous paint has its place for certain jobs, if properly used. It so happens that the luminous paints which have the longest afterglow are the ones which are very sensitive to moisture, and a good deal of time was spent during the war trying to find a way of using them to have a greater life out of doors. Some success was achieved and the work carried out on that particular type of paint was turned to good advantage for the study of the very subject mentioned by Mr. Lawrance, namely, water movement. We have evolved a test or a method of demonstration by which wood is painted with luminous paint, and water passing into the wood and behind the paint betrays its presence by the effect on the luminous property of the paint. That is interesting because in the past we have talked about water movement, but we have rarely been able to track it or map it out.

Mr. GRENFELL BAINES: I presume that all the paint mentioned in the Paper was air dried. Recent developments have led to greater production in the factories of larger and larger units of buildings for drying by infra red. Does the author think that the production of steel would be better carried out under conditions of stove drying or infra red drying where possible?

Mr. JAMES LAWRANCE: All other things being equal, I think that there is an advantage in stoving because it means the absolute elimination of moisture. There is an expanded condition of the metal, slightly reduced viscosity of the media and everything is favourable to bringing about a good connection between paint and method. In insisting on other things being equal, I wish to point out that a certain class of manufacturer has tried to suggest that, because his particular material is painted with a stove paint, it must be alright. That does not follow at all. You can stove brush if you want to, but you will not get a good result. With a suitably formulated paint, however, I should say that the method of doing it in a factory in these conditions would be an advantage, and the infra red is introduced largely because it favours quick drying and, of course, in mass production that is an important feature. I think one must remember that in all these things the formulation must be such that it gives the results wanted by the method of application. It cannot be assumed that the mere fact of stoving is going to be helpful unless the material is right to start with.

Mr. MANSON (Ministry of Education): I should like to pay a tribute to the work which Mr. Lawrance has done for the painting craft. For many years he has given us articles and has addressed meetings, and that has been an invaluable contribution to the craft of painting. I think he has no equal in his capacity for making these complex matters sound quite simple and understandable to ordinary people. Paint and painting is really a very complex matter, and for a number of years we have tried to give to the painting apprentice some idea of the background, and it is a task which we have found extremely difficult. But we have had the help of Mr. Lawrance and of Mr. Noel Eaton, and they are unique in their capacity for dealing with the subject.

In dealing with the question of apprentices and scientific background, we have recently got the idea that it is no use attempting to go into the physics and the chemistry of the subject, which has always been very difficult and which is more so now than it was thirty years ago. What we can do, however, is something along the lines of Mr. Lawrance's present Paper. We can start with the idea of paint being a film and that, in order to be of value, it must be able to stand up to various tests and be of a permanent character. We can emphasise particularly that it should be looked upon as a method of keeping out moisture. The question of moisture in buildings is one which has been drilled into us through building research. From the point of view of paint it is a very important approach, and it is an approach which is simple and understandable. Mr. Lawrance has explained quite a number of simple tests and we are hoping that a lot of them can be used in dealing with apprentices to the painting craft.

Mr. OSBORNE: Certain public bodies and other people often ask paint manufacturers to guarantee the performance of their product. In view of the large number of varying conditions outside the control of the manufacturer, I should like to ask what is the author's opinion on that point? Does he think it is fair for people to ask manufacturers to guarantee the performance of their paint?

Mr. JAMES LAWRANCE: That question opens up a very large and controversial subject. It seems to me to be quite logical to assume that no one would guarantee anything over which they had no control. What amount of control has a manufacturer over the paint he produces? He can provide a paint which will give certain results under certain performance tests. That paint goes out of his factory in a can with a lid on it. But that lid can be taken off, and once it is anything may be put into the paint. When the paint is applied it can be put on all sorts of surfaces. I have seen distemper spread over straw and dirt, and I have seen a coat of paint put on a wet sill. One argument is that there should be a clerk of works on the job who will see that the paint is properly applied.

The question which arises is: how can you guarantee a painting job when it is a matter not only of guaranteeing the paint but the job itself, which is many times the value of the paint used and which is a job that is not carried out by the paint manufacturer? The reply may be given that the manufacturer will have an opportunity of seeing the work and of studying whether the paint can be applied. In the first place, however, the manufacturer cannot be on a job all day long, but, apart from that, it is the paint contractor's function to say whether or not a surface is fit to paint. In the old days that was what the paint contractor did, and he mixed his own paint. The manufacturers have now taken that job from him. If you had a guarantee for any paint worthy of the name, it would have to carry with it a guarantee of the painter, the surface and the weather. I should say that the paint manufacturer cannot logically be asked to give any guarantee other than that his paint is made according to the high standard which he has attained through many years' experience.

In many cases people have asked whether a B.S.I. paint can be supplied and guaranteed by the manufacturer. Obviously, you cannot dictate to the manufacturer how he should make his paint and then tell him he must guarantee it. Clearly, if you make a B.S.I. paint it is up to B.S.I. standard. If the paint is supplied on a performance test, then it must be up to that performance standard, but you cannot possibly ask a manufacturer to say what a B.S.I. paint can do because it is specified by an outside body. If it is a specified paint, the body which is responsible for the specification will take the responsibility for what it will do. If it is a proprietary paint, made by the manufacturer, and if it is any good at all, provided that it is guaranteed up to a certain standard it should be satisfactory up to that standard unless there are other factors which upset its performance, such as surface, weather and the human element. I remember talking to one contractor about a case in which the paint had evidently been thinned. I rather hesitated to say that it had been thinned, but the contractor admitted that it had been and that the men did sometimes thin the paint. I think that most of the troubles which occur are not necessarily due to the contractor himself but to some of the practices common among the men using the paint. My reply to this question is that a guarantee should be confined to a guarantee of the material. If necessary, the manufacturer could submit a sample for testing, but it is impossible to guarantee other outside factors.

Mr. H. G. DOWLING: Does that not emphasise the statement made by Mr. Clark that, unless we can produce a genuine all-purpose paint which can be applied under all conditions, it is essential that the public should place the care and preservation of their buildings in the hands of competent men who can carry that work out? I believe that if this project is carried out, some equivalent organisation or individual may produce a series of booklets on "How to build a house." In the interests of the public and of architects, I am of the opinion that such booklets as have been suggested should not be produced. The very fact that the author has had to deal at such length with the subject as he has done shows the danger of issuing publications of this kind.

Mr. POTT: On the question of steel work, the author says in his Paper: "Priming made from red lead and linseed oil is in common use and has frequently been rated very high in exposure tests carried out in order to assess the value of different types." I had the idea that the right kind of red lead was an inhibitive pigment. Is that not so?

Mr. JAMES LAWRANCE: Yes, that is so. Red lead is an inhibitive pigment, but I am afraid I have taken red lead for granted.

Dr. BELL: In order that there should be no misunderstanding on this question, I should like to point out two things. First of all, there is already in existence a Study Report which the public can buy, and secondly I should like to quote again what Dr. Jordan has said in his introductory remarks: "It occurs to me that the Study Report might be broken up into a number of sections which, when embellished by the kind of material which Mr. Lawrance is going to give in his paper, would form a very desirable series of pamphlets of the type envisaged." There is no project; this was simply an idea which arose through someone writing in a journal and pointing out that the public would insist on painting.

Since I have heard all that you have had to say on this subject I think we can leave it that I will convey to Dr. Jordan the sentiments expressed here this evening.

THE STRUCTURE OF SALISBURY CATHEDRAL TOWER AND SPIRE

By W. A. FORSYTH, F.S.A. [*F.*]

The story of the building of Salisbury Cathedral is perhaps the most romantic of the great mediæval churches in England. Two miles north of the city and four miles from Stonehenge lies the great prehistoric station of Old Sarum.

In the Norman period a Cathedral and its appurtenant buildings were erected on the site in 1092; the outlines of the plan are visible to-day in the preserved walls.

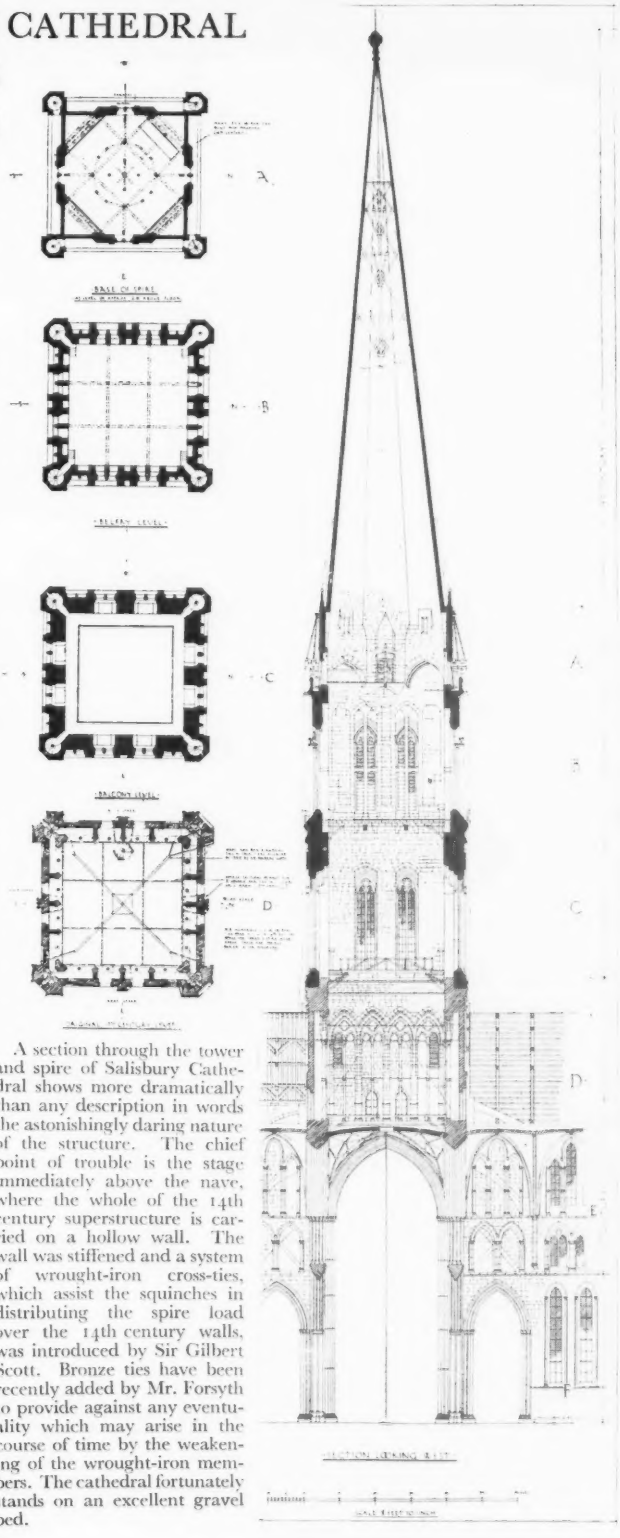
In 1220 Bishop Richard Poore took the courageous step of transferring the building of his great new cathedral to the "water meadows" down by the Avon and it is here that our main subject begins. The new site at that time was said to be one "to which the whole world cannot produce a parallel." That is not entirely an extravagant statement. The area of the Close is slightly less than half a mile in length and width. It adjoins the Avon which was navigable for transport until recent times. The surface is devoid of gradients and has the best possible geological formation for carrying great buildings.

For the new Cathedral church a plan of great dimensions was laid down. From the start, design and construction were of the highest order of that Early English technique, marked throughout in its beautiful craftsmanship and design. The plan consists of a ten-bay Nave, a Choir of seven bays, north and south Transepts, all with aisles, a Retrochoir, Sacristy, north porch, Chapter House, Muniment Room, Library and Cloisters. The total length is 480 feet, the width of the Transepts 230 feet, the internal width of the Nave, the Choir and of the early tower, 33 feet. The plan remains generally in its mediæval form. Two Chapels, Hungerford and Beauchamp, were, however, removed in the early nineteenth century from the sites on either side of the Lady Chapel Choir. A porch was removed from the north transept wall, otherwise the Cathedral remains in its original lay-out.

The vault of the Nave is 84 feet high. The thirteenth century height of the low tower was about 115 feet from the floor. Then followed one of the most remarkable feats in building of all time. In the fourteenth century two stages of a tower and a great stone spire were added upon the original structure, together with a considerable amount of metal reinforcement in the earlier and later masonry, reaching ultimately to a height of 400 feet. These dimensions convey a general sense of the scale of the Cathedral, and although it is by no means the largest example, its principal character lies in the abnormal height of its central feature and in the general uniformity of thirteenth century design throughout.

Below the top soil of the site and at a depth of five feet is a deep bed of coarse flint ballast, somewhat uniform in its structure and permeated by a chalky clay mixture which has a binding effect. For foundation purposes it is ideal but irksome to excavate and to spread. The saturation line of the site is at a general high level varying with the rise or fall of the river. The Nave floor is slightly below the surface of the site of the precincts and in exceptionally wet seasons the interior of the Cathedral is subject to flooding.

This formation receives abnormal, concentrated loads. In modern engineering requirements a load of six tons to the square foot would be deemed a safe calculation, yet the great weight of the piers carrying the tower and spire indicate that there are *20 tons* to the square foot on the gravel soil. In 1937 this calculation was confirmed by the well-known consulting engineers, Messrs. Douglas Fox & Partners. The foundations hitherto explored go down no more than five to six feet from the surface; the bases of the piers have in several instances tilted, or have



A section through the tower and spire of Salisbury Cathedral shows more dramatically than any description in words the astonishingly daring nature of the structure. The chief point of trouble is the stage immediately above the nave, where the whole of the 14th century superstructure is carried on a hollow wall. The wall was stiffened and a system of wrought-iron cross-ties, which assist the squinches in distributing the spire load over the 14th century walls, was introduced by Sir Gilbert Scott. Bronze ties have been recently added by Mr. Forsyth to provide against any eventuality which may arise in the course of time by the weakening of the wrought-iron members. The cathedral fortunately stands on an excellent gravel bed.

compressed the ballast, but the formation remains firm, without contraction. This tilting or depression has not increased for hundreds of years. There is no attempt at footings as we understand them beyond the use of larger flints and occasionally some old stone re-used and roughly laid in mortar. The *stone* throughout is from the Chilmark quarries in Wilts—a reliable limestone of a greenish-grey colour. A great quantity of Purbeck marble is also seen in constructional features as well as in applied decorative works ; it is mainly used to carry concentrated loading.

Fortunately the mortar throughout is composed of lime and sand and it is largely due to its adaptability that no great destruction from the inevitable movement of unbalanced features has resulted in the body of the Cathedral. The structural condition, however, is not stable nor indeed reliable, but the general state after 700, and in parts 600 years, indicates the great quality of the masonry. Constant qualified supervision is indispensable, however.

The comparatively slight sinking of the tower supports is reflected in the ridges of the main roofs which dip as they near the tower.

Mediæval builders were highly skilful yet intrepid. During the great Norman period when Church building was rapidly extending, much construction appears to have been hurried and thus imperfectly considered. Much collapse has subsequently taken place in buildings of that period, mainly due to the poor and hasty wall construction. The walls were usually stone-built on the inner and outer faces and the intervening space filled with lime-mortar rubble. Inevitable shrinking and poor quality of the cores has accounted for most of the early defects and for the collapse of central towers of Cathedrals in the past. At Salisbury Cathedral the thirteenth century core of the walls is very good of its kind in all the instances which I have examined, and it accounts largely for the reliable state of the walls. Externally there is practically no indication of a faulty core within.

All the main arcades have strong solid piers of Purbeck marble to which are applied or attached, small shafts with no constructive purpose, but which by their scale combine with the moulded Chilmark stone features and carry down the elaborate work of the arches. The vaulting ribs are good stone members supporting the webs or cells of a light chalk-like concrete. There is practically no masonry in the vaulting cells. This is a distinctive feature unusual in composition and character of this period. Apart from some inevitable and slight shrinkage the concrete construction of the main vaults remains sound. It is light in weight yet homogeneous and cast in curved forms in the cells or webs. Some internal movement of piers and arches is, however, visible mainly as reaction to displacement by the stupendous central load and it has existed for at least six centuries with comparatively little subsequent development. The Nave and Choir arcades, for instance, are reclining from end to end but receive good abutment from piers in the east and west walls.

The general delicacy in many of the constructional features offers but little resistance. Much of the building design is daring and intrepid yet beautiful in form, unsurpassed in any period of church architecture.

A remarkable example of accurate building is seen in the Purbeck shafts supporting the vaulting of the Lady Chapel. There are clusters of four of such shafts and a number of single shafts of this nature carrying vaulting with hidden heavy stone walls which in turn support the extensive oak roof framing and its external lead covering. The foundations of the shafts are sound, and again reflect the reliable and constant character of the soil of the site. The single shafts are 11 inches in diameter and are 30 feet in height, in two lengths ; each single joint is tied or set in a narrow brass band as is seen in shafts in the north porch and elsewhere throughout the building, inside and out. Other shafts of similar height and forming groups of twos and fours are respectively 5½ and 7 inches in diameter, 30 feet high. I cannot conceive any more daring example of building construction and it has survived for over seven hundred years. Moreover, it is particularly beautiful in form and material. It is very delicate in character, being liable to disturbance from movements of the oak roofs which are all covered with lead.

Turning now to the great problem of the immense central feature of tower and spire. It was a general conception of the times to limit the space above the crossing to a height of the abutting roofs, terminating internally in a traditional form of lantern. Westminster Abbey is such an example but has remained in an incomplete state. This feature at Salisbury is traditionally deemed to have ended at a level slightly above the ridges of the main roofs for which the change in external and internal design—from Early English to Decorated—offers supporting evidence. The thirteenth century wall above the great arches of the Crossing is 45 feet in height and is arcaded in a beautiful form, again with Purbeck shafts. It is 6 ft. thick but has a two-foot passage in the centre of the thickness The passage until recent years was approached from spiral stairs at each of the four angles entered from the main roofs. The two storeys of arcaded passages is perhaps unusual, yet they produce a magnificent effect when viewed from the Nave level. The internal dimensions of the tower are 33 feet square ; taken with 6 feet walls the overall outside width is thus 45 feet.

It is upon this hollow wall that the two great stages of the fourteenth century tower and the immense stone spire have been added and which after much anxious care and attention have survived for 600 years. There is nothing more beautiful in design or more daring in construction in the history of church building. The first step in the development was the filling in of the void above the main arches of the crossing with a substantial stone vault somewhat elaborate in design, and above it was placed an oak timber floor. The mouldings of the main stone arches of the thirteenth century were reworked to indicate the change of period. Then followed an extensive introduction of wrought iron bar reinforcement, from which the new walls rose. These later walls, however, are solid, of an average thickness of 6 feet and are raised some 85 feet in two storeys, in which oak beams and floors were inserted. At a height of 204 feet from the Nave floor the spire construction begins in the stone squinches or diagonal arches, off which the octagonal tapering form of the spire rises to an additional height of 176 feet. By this means the spire load is transferred to the solid walls which rise off the hollow arcaded thirteenth century walls, and then descends by the great arches and piers of the crossing to the ground below. In all this great distribution of loads much wrought iron " bandage " has been used. Such is the brief outline of this marvellous venture in stone building. The stonework of the spire averages 9 inches in thickness. The spire contains an elaborate and unusual feature in retaining the oak scaffolding off which the masonry was originally laid. It ascends practically to the full internal height and is supported by two stages of oak beams in the floors below. Much of this scaffolding touches the walls of the spire and assists in steadying the whole structure. It is a very interesting collection of oak struts, beams and braces and there remains still the original oak windlass which raised the spire stonework and other materials from the Nave level. All this developed central load has reacted visibly upon the walls, piers and arcades below.

It is a common feature in most central towers to find distortion in the supports. This is largely due, as Wren first pointed out, to the thrust of the side arches of the aisles and transepts. My view is that the distortion took place during building operations and that it increased when the vaults or roofs began to be built.

This condition is present in the majority of churches so planned. It is, for instance, observable at Westminster, which has no load of a spire or high tower. At Salisbury the same deflection probably existed prior to the raising of the central feature but increased considerably as the spire and tower loads developed.

It reacted to such an extent as to deflect the arcades of the Nave, the Choir and transepts. This gave rise to some anxiety in the fifteenth century. Two large stone screens were then inserted in the north and south transept arches of the Nave to resist possible movement of main piers on that side of the Crossing. No similar precaution was taken in a transverse direction but a very important insertion of inverted arches was built in the arcades of the north and south choir transepts to steady and uphold the heavily leaning arcades of the Choir. It is interesting thus to observe the general disturbance of the arcades abutting on the central space and their resulting flexibility.

It is truly remarkable that such stupendous structures yield, without collapse, to unrestrained yet active forces. It is the common story, however, that the first builders made little provision for the ambitions or responsibilities of their successors.

One of the delicate features of general construction concerns the preservation of the early wrought iron reinforcement partly buried in the walls of the thirteenth century stage of the tower, and which is rusting generally although slowly. While it is holding at the present time it has until recently been kept continually under observation. This reinforcement is mostly in the form of a series of wrought iron bars two inches square.

Wren added a considerable number of wrought iron rods and ties at this, the tender level.

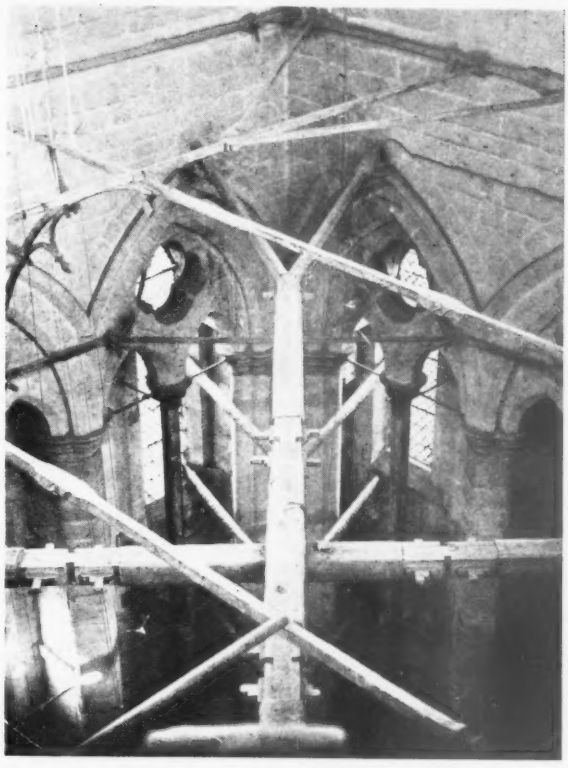
Much additional reinforcement was introduced in 1869 by Sir Gilbert Scott. This mainly concerned four tiers of crossed diagonal ties at the "lantern" level, gripping the walls of the angle staircases. There are four sets of these ties with an overall diagonal length of 65 feet and are unsupported yet taut.

There is a wealth of interesting design in the masonry of the spire, including pinnacles, panels and much moulded work. A predominating carved feature is a great distribution of the carved "ballflower"—the typical "Decorated" emblem.

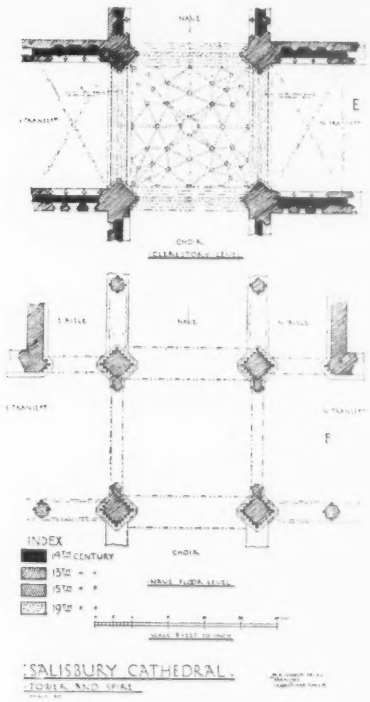
The periodical testing of the lightning conductors is also important, for the spire was struck in 1741 when fire broke out in the oak timbers. Since that date the Cathedral has escaped further injury from this cause.

There are four bells in the first stage of the tower which are used for chiming the hours. They cannot be rung in the ordinary manner without risking disaster to the fabric; they are therefore used for chiming only. There is no external dial nor does the position of the clock action lend itself to it.

The Clerestory stage of the walls of the Nave and the Choir is of great interest. They are again, roughly speaking, six feet thick and contain the usual passage space. The supreme tops of the walls are paved with heavy stones gripping the inner and outer thickness of the Clerestory and upon this paving the roof construction lies. With the exception of the roof of the north choir transept, which is the only mediæval type—trussed rafters—remaining, all the timber framing is of tie-beam and purlin form. It is a replacement dating mainly from the eighteenth or late seventeenth century consisting of heavy oak tie-beams 42 feet long, with braces, and trussed rafters. Longitudinal bracing has been included in most cases but it was omitted from the mediæval roof and of the Choir transepts, resulting in the bending southward of the north and south gables. The cause of this displacement has been remedied. There is an abundance of light and air passing through this timber construction in which there is scarcely any evidence of death watch beetle attack. The outside cast lead covering is laid upon deal boarding, much of which is set diagonally, thereby stiffening the construction. Practically no condensation reaches the oak members. The roof of the Muniment Room and Sacristy has been covered with sheet copper after replacement of some timbers which had been infested with boring insects. This metal is about one-eighth the weight of lead and any possible condensation on the underside of the metal carries a dilute poison which restricts the growth of a minute fungus upon which the beetle feeds in the dark unventilated crevices.



View of cross ties in the hollow walls carrying the spire.



(*Right*) Two plans of the piers and abutments

LONDON COUNTY COUNCIL HOUSING

The Proposal

During the last week of October 1945 information reached the Royal Institute that the London County Council were proposing to transfer their housing work from the Architect's Department to that of the Valuer. The information came from a reliable source and it appeared that no official publication of it would be made until the matter was presented to the Council for approval, when it would be too late for the R.I.B.A. to make any protest.

Direct Approach to the L.C.C.

Accordingly on 1 November a letter was sent to the Clerk to the London County Council asking if this information was correct and, if so, whether the Council would receive a joint deputation from the Royal Institute and the Association of Building Technicians. A reply was received from the Clerk on 2 November stating that there was such a proposal before the Civil Defence and General Purposes Committee to whom he was referring the request that a deputation be received. On 6 November the Clerk wrote stating that the Committee declined to receive the deputation. On 8 November the Secretary R.I.B.A. wrote again, reiterating the request for a deputation. The Clerk replied that this would be laid before the Civil Defence and General Purposes Committee which would meet again in a few days.

On 14 November the General Secretary of the A.B.T., Mrs. E. V. Penn, wrote to all the Labour members of the L.C.C. stating very fully the case against the proposal.

"The Times" Correspondence Starts

On 20 November the Clerk of the Council again wrote saying that the Civil Defence and General Purposes Committee regretted that they could not depart from their previous decision not to receive the proposed deputation. Accordingly the President R.I.B.A. wrote the following letter to *The Times* which was published on 29 November :—

> Sir,—My Council has learnt with dismay that the London County Council is considering the transfer of the major responsibility for the housing work of the Council from the Architect's department to that of the Valuer. I understand it is proposed that the Architect's Department will prepare standard plans for houses and flats, which will then be handed to the Valuer, who will be responsible not only for acquiring sites, as at present, but also for laying out the estates, presumably fitting the standard plans on to them as well as he can. This is the very negation of good architectural practice and cannot be too strongly condemned.
>
> The reputation of the Architect's Department of the London County Council is second to none and their housing work has set a very high standard. Should this proposal be adopted, it would be a retrograde step and contrary to the constantly reiterated advice of successive Ministers of Health to housing authorities to entrust their housing work to architects. It is true that the present Valuer possesses an architectural qualification in addition to those which a valuer should have, but this does not alter the principle that housing, as an important field of architectural work, should be wholly under the control of the Architect and not another official. Certainly it should not be divided in the way proposed.
>
> The Royal Institute wrote to the Clerk to the County Council asking if the Civil Defence and General Purposes Committee would receive a joint deputation from the Royal Institute and the Association of Building Technicians. This request has been refused. I therefore feel that this matter ought now to be discussed publicly before it is too late.
>
> I am, Sir, yours faithfully, Percy Thomas,
> President, Royal Institute of British Architects.

Lord Latham States His Case

On 1 December the following reply from Lord Latham, leader of the L.C.C., was published in *The Times*:—

> Sir,—I confess that I read with astonishment the inaccurate and indeed tendentious letter from Mr. Thomas, the President of the Royal Institute of British Architects, in *The Times* of 29 November. The facts are now public property, and the proposals for reorganising the housing activities of the London County Council can be studied in its printed agenda by anyone interested. As, however, busy people may read merely Mr. Thomas's letter and be misled by it, I desire to state shortly the true position.
>
> In the first place I defy anyone who does not know the facts to read Mr. Thomas's letter without being led to believe that the Council proposes to take architects out of housing. There is, needless to say, no such proposal. Mr. Thomas also says it is proposed to transfer the major responsibility for housing from the Architect's Department to that of the Valuer. This again is misleading because, as the Royal Institute have already been informed, the major responsibility for housing has always rested with the Valuer. Mr. Thomas refers to the reiterated advice of successive Ministers of Health to housing authorities to entrust their housing work to architects. There is no proposal to do anything else.
>
> What is proposed is to concentrate, for an experimental period of three years, for the sake of greater speed of production, in one department (the Valuer's, to be renamed the Housing and Valuation Department) work which is at present divided between three departments, the Engineer's, the Architect's, and the Valuer's. This will involve the secondment of the qualified architectural and engineering staff, who are at present engaged on the same work in their separate departments, to the Housing and Valuation Department, at the head of which will be the Director of Housing and Valuer. Under him there will be a housing architect in charge of the architectural work whose duty it will be, among other things, to prepare the layout and arrange for the grouping of dwellings, the typical plans of which will have been prepared, as at present, by the Architect to the Council.
>
> The question is one of creating an organisation calculated to secure the production of the largest number of good quality dwellings properly sited and laid out in the shortest possible time. There is, as I have stated, no proposal to take architects out of housing and there is nothing in what is suggested which contravenes the sound principles of town and country planning or affects the full consideration of planning aspects by the planning division of the Architect's Department. The material facts have been within the knowledge of the Royal Institute of British Architects for some weeks, and I can only suppose that Mr. Thomas has been badly briefed. The question has hitherto been in the committee stage and the reason why the Council's Civil Defence and General Purposes Committee declined to receive a deputation from the Royal Institute was not due to any lack of courtesy, but was well expressed in the Clerk of the Council's letter of 6 November, in which it was stated that the committee were not disposed to accede to an application which could not have been made at that time if there had not been an unauthorised disclosure of confidential information.
>
> The real objection of the Royal Institute of British Architects is to the proposal that architects should be required to work in a department the head of which is not himself the Architect to the Council. But no one without knowledge of the proposal could deduce this from Mr. Thomas's letter. Knowing as I do the acute hardship and suffering of many thousands of families in London who are without homes, I cannot help feeling that the speedy provision of housing accommodation is of greater human importance than unreal questions of professional prestige.
>
> I am, Sir, yours, Latham,
> Leader of the London County Council and Chairman,
> Civil Defence and General Purposes Committee.

The President's Reply

The President replied on 3 December as follows :—

> Sir,—Lord Latham complains that my letter was inaccurate, tendentious, and misleading. May I ask, through your columns, some questions of Lord Latham, which, had his committee consented to receive a deputation, could have been put verbally and would possibly have avoided this public controversy?
>
> Lord Latham states that the major responsibility for housing has always rested with the Valuer. Does Lord Latham deny that in the past the Architect and his department have been responsible not only for the preparation of the house plans but for the layout and the grouping of the housing estates? Is it not correct to state that the proposal at present before the Council would place this work of siting the houses on the estates in the

hands of the Valuer? This is the major point of which we complain. No one suggested that the Valuer would be able to carry out this work without the assistance of skilled architects, but these architects would be responsible to an official who is not the Architect of the Council, and it is the experience of the Royal Institute that architects produce better work when they are responsible to an architect and not to another official. We recognise the need to concentrate the housing work in one department, but we feel that this should be the Architect's Department.

It is not, I believe, unfair to state that in the past sites for housing have been selected by the Valuer's Department without prior consultation with the Architect and that these sites have in some cases proved unsuitable. If the Architect, who is also the town planning expert of the Council, had been consulted, these mistakes would not have been made. Have we any guarantee that, if the whole responsibility is put into the Valuer's hands, mistakes of this nature will not be made in the future?

Lord Latham states that the reason why a deputation was refused was not due to any lack of courtesy, but to the fact that the Council's Civil Defence and General Purposes Committee were not disposed to accede to an application which could not have been made if there had not been an unauthorised disclosure of confidential information. Does Lord Latham suggest that the Institute, having been informed of the proposals under contemplation, should sit back and take no notice until the matter was on the agenda paper for the Council meeting, when, as he well knows, it would have been too late for the Institute to take effective action?

This is no mere "unreal question of professional prestige," as Lord Latham tries to suggest. It is precisely because we at the Royal Institute know that the proposed organisation will be less efficient than the existing one, that I am making this protest. He need not tell us how acute is London's housing problem; we know it only too well. But we maintain that the citizens of London deserve housing of the highest quality and that this proposed organisation will not provide it.

I am, Sir, yours faithfully, PERCY THOMAS,
President, Royal Institute of British Architects.

MORE CORRESPONDENCE

On 4 December a further letter from Lord Latham and one from Sir Patrick Abercrombie were published. It is understood that *The Times* received more than sixty letters in support of the President from various influential persons, but the letter from Sir Patrick was the only one published, doubtless for reasons of space. It will be noted that Lord Latham made the important concession at the end of his letter that the Civil Defence and General Purposes Committee were now prepared to receive the deputation.

Accordingly the President closed *The Times* correspondence with a further letter. These three letters were as follows:—

Sir,—Mr. Thomas confirms in his letter to you of 1 December my statement that the objection of his Institute to the London County Council's plan for concentrating its housing work in one department in the interests of speed is that architects would be required to work in a department the head of which is not himself the Architect to the Council.

He agrees with concentration provided that it is concentration under the Architect. In other words, he is quite happy that engineers and surveyors should do what he will not tolerate for architects—namely, work in a department headed by a member of another profession. Could it be more clearly admitted that for Mr. Thomas the principle at stake is professional prestige?

Mr. Thomas's statement that in the past certain sites acquired by the Council have proved unsatisfactory is beside the point and, I am forced to add, again incorrect. It is clearly stated in the report before the Council that the proposed director of housing will continue the present practice of consulting the Architect to the Council on the planning aspect of schemes within the County of London, and the planning officer to the local town planning authority for schemes outside. The guarantee that these consultations will be made lies in the requirement upon the Council as developer to obtain the approval of its Town Planning Committee in London and of the local planning authority elsewhere. Thus, as regards both planning and architectural aspects, the quality of the houses built by the Council will continue to be assured.

I should add that at their meeting to-day the Civil Defence and General Purposes Committee of the Council decided, now that the matter is public, to afford the Royal Institute of British Architects an opportunity of sending a deputation to the committee before the Council is asked to reach a decision on the proposals.

I am, Sir, your obedient servant, LATHAM,
Leader of the London County Council and Chairman,
Civil Defence and General Purposes Committee.

Sir,—As one of the authors of the Plan for London I am dismayed by the proposal to take the work of rebuilding London's damaged communities and creating new ones from the Architect's hands and give it to the Valuer.

Housing and planning are inextricably involved; and the experience I have recently had in applying the broad principles of the plan to the detailed development of the estates of the Ecclesiastical Commissioners in South London has shown how complicated and yet how worth-while the new method of development is. The old plan of snapping up cheap sites wherever obtainable by the Valuer and laying them out as separate units has produced no communities fit for human beings and has blocked road and other improvements. The same policy will continue if the London County Council adopt this proposal. Finance which should be the servant of the community will have precedence over human needs. Lord Latham's thin veneer of Housing Director will not deceive anyone who knows the tough rough core of the Valuer's department.

It is sad to think that those who worked with me on the plan are still unable to grasp that housing is not the mere shelling of peas, and (to mix my metaphor) deciding how many the ground will take by the price paid for it. Social communities of human beings require a warmer handling. The country has looked to the London County Council, which produced the first reconstruction plan, to lead the way in its realisation, after having endorsed its main principles. Here is the first threat of defeat. This is no mere question of professional prestige but of a fundamental attitude to social reform.

Your obedient servant, PATRICK ABERCROMBIE.

Sir,—Now that the Civil Defence and General Purposes Committee of the London County Council has agreed to receive a deputation from the Royal Institute of British Architects and the Association of Building Technicians, there is no need for me to reply publicly to to-day's letters from Lord Latham and the President of the Chartered Surveyors' Institution. I thank you, Sir, for allowing this matter—so important for the future of Londoners' homes—to be discussed publicly.

Your obedient servant, PERCY THOMAS,
President, Royal Institute of British Architects.

THE DEPUTATION

On 11 December the President R.I.B.A. headed the following deputation which attended a meeting of the Civil Defence and General Purposes Committee:—Sir Patrick Abercrombie, Sir Charles Reilly, Mr. Cecil Howitt (Vice-President), Mr. L. H. Keay (Vice-President), Mr. Alfred Bossom, M.P., the Secretary R.I.B.A., Mr. C. D. Spragg. Representing the Association of Building Technicians were Mr. Colin Penn and Mr. Robert Townsend. (Mr. Kenneth Campbell, Chairman of A.B.T., was unable to be present.)

The President spoke on behalf of the deputation and presented a written statement on which some discussion ensued. The Committee did not, however, come to any decision when the deputation was present. The Clerk to the Council subsequently wrote that the Committee "saw no reason to vary their recommendations to the Council."

As the deputation was entering County Hall, the President was handed a document signed by every available R.I.B.A. member of the London County Council staff, namely 113, expressing "our appreciation of the action taken by our Institute and to assure you of our whole-hearted support in your endeavours to prevent this retrograde and unjustifiable proposal being put into operation."

THE COUNCIL MEETING

An unusually long debate took place at the meeting of the Council on 18 December. It was obvious that there was by no means full support for the proposal in the ranks of the majority party. Although an official whip was put on the party, the proposal was eventually carried at a late hour by only six votes, the lowest majority which it is understood the majority party has obtained since 1935.

PRACTICE NOTES

EDITED BY CHARLES WOODWARD, [A.]

WAR DAMAGE

Cost of Works Payments

Mr. Michael Rowe, K.C., read a paper at the Chartered Surveyors' Institution on 21 November on the above subject with particular reference to the new Practice Note. Mr. Rowe was the Deputy Secretary of the War Damage Commission. The following extracts from his paper are reproduced by the courtesy of the Editor of the *Chartered Surveyors' Institution Journal*.

"The occasion which called for the Practice Note is obvious. It was the end of the war and the beginning of the period of reconstruction—the time when everyone would begin to lay plans and want to know more accurately where he stood in the matter of war damage compensation. Its object is to tell people where they do stand, and how to lay their plans if they want to use their rights to war damage compensation to the best advantage."

"The Commission is an administrative, not a legislative body. It is bound by the War Damage Act 1943, and it is bound by Treasury Directions issued under and in accordance with that Act. There are some things which it cannot do, or perhaps I should say which it is advised it cannot do, under the Act, for on some points it can, of course, be challenged in point of law."

"Few of you, I think, would differ from the very broad principles laid down in paragraph 3: the difficulties arise in the infinity of minute differences of circumstances. If you are to steer a way through these differences you must try to understand the spirit behind the whole Note. I claim unashamedly that that spirit is to do justice, in the best sense of that word. It would have been easy to have rested upon a rigid interpretation of the Act. It would have been easy to become a sort of "universal aunt," letting everyone have what they wanted, although this might have led to difficulties with the watchdogs such as the Auditor-General and the Public Accounts Committee. The Commission has chosen neither course. It has decided quite deliberately on the one hand to interpret the Act in favour of the claimants so far as it possibly can, and on the other hand, to do its level best to prevent the Commission being exploited by people out to get something more than either the Act or justice warrants. For, let me say it flatly, there are far too many people who deliberately set out to get not only the making good of the damage in new materials, but something more, not merely putting back with improvements, but putting back with improvements plus extensions plus the making good of years of neglect."

"One of the most important innovations in the Practice Note is rule (vi) of paragraph 4. It permits a claimant to retain his cost of works payment even if part of the works are executed on land which he has added to his old site since the damage. For example, if a road is widened in front of a destroyed shop, leaving insufficient building depth, but the claimant can get a bit of extra land at the back, he may add it on and rebuild on the combined plot without losing a penny of his permissible amount. The Act prevents us paying for anything but 'making good': we cannot pay the cost of rebuilding on a wholly different site, but we have now agreed that when the Act speaks of making good with alterations and additions, it may be read as including additions to site as well as to buildings."

"There may be cases in which a single residence may be rebuilt not just as two flats or maisonettes (which is comparatively simple) but as two different residences and yet not lose all right to a cost of works payment. For example, two sisters lived in two semi-detached cottages, both of which were destroyed. They wished to build one detached house on one of the sites, using the other site as a garden. The Commission's answer was 'You may have a cost of works for one cottage, regarding the house as one cottage made good with additions, and a value payment for the other.' To sum up on this aspect of the Practice Note, the Commission is giving as wide a latitude as it can and claimants can best help themselves by trying to bring their proposals within the Commission's rules and by avoiding unnecessary complications."

"The second point dealt with in the Note is substitute materials—a very thorny topic these days and one which, I believe, can only be dealt with satisfactorily by common sense and a willingness to give and take. The Commission knows perfectly well that there are horrible problems in store for it, but is resolved to apply one main test—is the property with the substitute as good as it was with the old material? That is the guiding line, but there are inevitable refinements."

"The last, and, for you, perhaps, the most important topic in the Practice Note is 'permissible amount.' There are several new points to be noted, which we believe will on balance be considerably to the benefit of claimants who wish only to make good their loss in the best way. The first major change is that the 'permissible amount' is no longer the cost of identical reinstatement subject only to the omission of valueless parts. That used to be our view of it, and it was tied up with the narrower view of what could fairly be treated as making good. Experience satisfied the Commission that a wider view on both points was necessary if on the one hand it was not to be unduly restrictive of re-development, and if on the other hand it was to avoid paying for a great deal more than 'making good.' In effect the permissible amount is now equivalent to the sum which a reasonable and prudent owner would himself (without using a poorer standard of workmanship or materials) require to build a property substantially the same in shape, size and general character as, and equivalent in use, quality and value to, the property as it existed before the war damage. If you are dealing with a comparatively modern property, there is a strong probability that this definition will reproduce precisely the same result as would be obtained by estimating the cost of identical reinstatement. What the Commission is really aiming at is to eliminate from permissible amount downright extravagance, and to prevent owners of properties with extravagant features getting so large a permissible amount that, by eliminating the extravagances in fact when they rebuild, they can use the saving to get a property bigger and better than ever it was. Now please do not misunderstand the word 'extravagance.' It does not mean 'expensive' but 'wastefully expensive.' I do not want you to go away with the idea that the Commission intends to penalise good quality in a building or to eliminate features that have an æsthetic or amenity, but little utilitarian value. It does want to avoid waste. For instance, a tenement building had 2-foot thick rubble outer walls faced with natural stone Ashlar. The owner proposed to rebuild with 16½-inch hollow walls faced with synthetic stone blocks. He would thus save a considerable sum which he would have used to install a number of new amenities. The Commission said 'No, we will pay only for walls built in modern methods. To replace the old walls would have been an extravagance you would not have indulged in if you were paying the bill yourself; nor shall we.' There are countless illustrations of this sort of thing and no doubt there will be differences of opinion about some of them, but the question is really a simple one: 'Should I advise a client who wanted to build a property similar in shape and size to the destroyed one, to rebuild it by the same methods of construction and with the same materials, or should I advise him to get the same result more cheaply by using more modern methods and alternative materials?' Excess height is a common example. Many opportunities will occur for the introduction of steel frames and ferro-concrete."

"This part of the Practice Note might be said to be 'against claimants,' though we think, and I hope you will agree, only greedy claimants. The other changes are, I think, all in their favour. In the past some of you may have been irritated by having bills or estimates for works including alterations and additions, scrutinised item by item, with the Commission knocking down items which would cost more than exact replacement and refusing to give credit for items which would cost less than exact replacement. That sort of process is to be stopped. Provided always that he is 'making good,' the owner can spend up to the permissible amount as he pleases, altering and adding as he thinks best. If he can make a saving in one respect, he can introduce an improvement or an innovation in another. But I must make one or two qualifications. The Commission cannot pay more than is actually spent, nor more than the works actually executed might reasonably be expected to cost; and it cannot pay for work which is no part of a scheme for making good, *e.g.*, ordinary maintenance. It is therefore a mistake to imagine that the Commission will *necessarily* pay precisely the permissible amount agreed with a claimant before the works were begun. Usually, no doubt, this will be the case, and previous consultation will eliminate most if not all of the difficulties that would otherwise arise. But in every case the Commission must see that its money is spent on the right object."

The Note referred to in these extracts is entitled Additional Practice Notes and may be obtained at H.M. Stationery Office, 2d.

Contributions and Payments

In answer to a question the Chancellor of the Exchequer stated that the contributions received and the payments made under Part I of the War Damage Act 1943, up to 31 March 1945, were £152,000,000 and £230,000,000 respectively. The receipts and payments under

the Private Chattels Scheme up to 31 October 1945 were £16,000,000 and £[illegible],000,000 respectively, but in addition there are sums amounting to £2[illegible],000,000, the payment of which is deferred under the Act. (7 December 1945.)

Rebuilding of Cost-of-Works Houses

Asked what facilities and priorities the Government are giving to house-owners to rebuild for their own occupation houses which were destroyed by enemy action, the Minister of Health replied that subject to conditions as to size, the rebuilding of houses which are subject to cost of works payments are given equal priority with new house building. (6 December 1945.)

BUILDING REGULATION

Civil Building Licence

Asked whether he is prepared to extend the maximum limit under the civil building licence from £10 to £25, to assist builders in carrying out urgent sanitary repairs to working-class houses, the Minister of Works replied that the limit referred to is fixed by a Statutory Order which expires on 31 January 1946. The terms of a new Order are under consideration. I would point out that local authorities are empowered to issue licences on my behalf up to a limit of £100 in any one case for work of the type to which my Hon. Friend refers. (11 December 1945.)

Non-traditional Construction

In a Circular 223/45 dated 11 December 1945 addressed to Housing Authorities in England, the Minister of Health has authorised them to issue building licences to private builders for new houses of non-traditional types of construction as well as for houses of normal construction. The selling price of such houses will be £1,200 including land, roads and services outside the London Civil Defence Region, and £1,300 within that Region inclusive of land, roads and services.

TOWN AND COUNTRY PLANNING

Interim Development

The Minister of Town and Country Planning has made a Provisional Order dated 21 November 1945 cited as the Town and Country Planning (General Interim Development) Varying Order, 1945. The Order enables a Local Education Authority or the governors or managers of a voluntary school on land held before 1 October 1945, to erect huts, and to alter buildings erected before that date, for the purpose of providing school accommodation in connection with the raising of the compulsory school age under the Education Act 1944. The Order, unless previously revoked, will cease to have effect when the Emergency Powers (Defence) Act 1939 expires on 24 February next. Circular No. 19 dated 27 November 1945 issued by the Ministry of Town and Country Planning explains the reason for the Order.

Open Spaces

Asked what arrangement he is making to provide alternative places of recreation, etc., for the community where commons and open spaces have been taken over by the Service Departments, and where footpaths have been closed and are not to be returned for public use, the Minister of Town and Country Planning replied that it would be premature to consider alternative provision in the matters referred to until a final decision has been taken as to the permanent requirements of the Service Departments. Every effort will be made to secure the release of open spaces and footpaths wherever practicable. (11 December 1945.)

FEES

Conversion of Houses into Flats

The Ministry of Health has addressed a Circular to Housing Authorities in England enclosing a revised Scale of Architects' Fees for the conversion of houses into flats. The Circular is 226/45 dated 17 December 1945.

The Circular points out that the Scale of Fees for the repair of war damage to houses set out in Circular 2720 remains unchanged and where the works to be carried out are partly of war damage, partly of repair and partly of conversion, the scale of fees adopted should be that appropriate to the type of work predominating in the particular case.

BOOK NOTES

Patrick Geddes: Maker of the Future. By Philip Boardman University of North Carolina Press, Chapel Hill. 1944. $5.00

REVIEWED BY ALEXANDER FARQUHARSON

At this moment of time, when surveys and planning have a world-wide vogue, and indeed have become for many individuals and peoples the basis of a faith in the future, it is appropriate that a full-length study of Sir Patrick Geddes should be published. In Mr. Philip Boardman an author has been found whose discipleship is unquestioning and enthusiastic, and in the University of North Carolina a publishing body which has done outstanding service to regional studies. The omens therefore have been favourable. Has the achievement fulfilled their forecast?

As I shall suggest later, credit is due to Mr. Boardman for some features of the book. On the whole, however, it has left me disappointed; and on trying to define the causes of this reaction I distinguish two which I shall summarise here.

Mr. Boardman has chosen to present his subject in a popular rather than a scholarly dress. In writing this I do not forget that the standards and methods of popular writing are not the same across the Atlantic as with us, and books that we should class as popular (with an implication of less careful scholarship) may be accepted with little question in the more generous intellectual climate of the U.S.A. Giving full weight to this, however, I cannot stifle my doubts about the extent to which Mr. Boardman has chosen to follow the methods of the journalists*—the striving after dramatic effect, the presentation of ideas in the form of conversations between Geddes and others, the selection of and emphasis on high lights (*bon mots* and so on), and the stressing, as it seems to me, of the conflicts in which Geddes was often involved. In doing so he has the excuse that Geddes himself was a master of drama, and that dramatic presentation, embodying all the above-named elements, was essential to his own method of popularisation. It is, however, an old story that the tools of the master do not necessarily work in the hands of the disciple. Some readers may find that Mr. Boardman's method conveys to them the homely yet vivid outlook, the surprising fusion of realism and imagination to which Geddes constantly gave expression; frankly, after a chapter or two, I found myself a little weary.

I wonder if Mr. Boardman has quite grasped the implications of popularization at its best—as understood here and in his own country? Many of us cannot forget our reading of T. H. Huxley and William James—writers who combined mastery of their subject with a gift for serious exposition in simple language. It is on this score—of mastery of the subject—that my second doubt arises. Take, as an example, the account of Geddes' relation to the Le Play School. The facts about his first personal contact with the school are given. What about contact in ideas? Mr. Boardman makes the broad statement (which requires clearly defined reserves to make it accurate) that Le Play was the originator of the Regional Survey method. Le Play's greatest contribution to sociology—his monographic method—is not mentioned. Geddes' development of Le Play's rough classification of simple or primitive occupations into the valley section is not explained, nor is his development of *lieu travail famille* into a two-way formula, Place Work Folk or Folk Work Place, to allow for human initiative as well as for environmental conditioning. Still more surprising—Geddes' transfer of the monographic method from family to city is slurred over so as to leave the reader with no sense of its extraordinary importance for present and future.

I hope Mr. Boardman will forgive me for pointing out these weaknesses: I cannot now fail to mention some useful features. Architects and planners who cannot give time to an extended study of the literature will certainly find that Mr. Boardman gives them much light on Geddes' ideas, the events of his life and his experience. Further, he provides a basis (which was not provided by earlier books such as *The Interpreter*, by Amelia Defries) for any future study of the subject. That basis might have been a little more secure if the chronology of the events recorded had been set out more clearly. On the other hand, the linkage between Geddes' personal opportunities and development and his ideas is brought well to the front. In its valuable bibliography the book lists many of the sources to which future students must go; notes on the reviews of Geddes' published work might have added something useful. Further (a set-off against a weakness mentioned above), as so many of Geddes' ideas were expressed first and best in conversations, it is good to have a record, first-hand or second-hand, of many of these.

Mr. Boardman has also done us another service (which indeed he modestly suggests in his preface): he has revealed more clearly the need for a thorough study of the whole body of Geddes' ideas in their historical origin, their development in his thought and their practical bearing, immediate and future. Until such a study has been achieved, students will continue to be grateful for what Mr. Boardman has given them.

* I am troubled by the light tone of the passages about Lady Geddes on pages 423 and 427.

Architects' Year Book. Edited by Jane B. Drew. 4to. 412 pp. inc. 108 pp. adverts. Paul Elek. 1945. 35s.

This is a new-style year book which endeavours to give its readers a general view of progressive ideas in all the multifarious aspects of an architect's practice and interests; every subject worth consideration seems to have been given a place among the thirty-one chapters. The editor, Miss Drew, can be praised wholeheartedly for the success with which she has collected her team of authors, every one of whom can speak on his subject with authority and almost all of whom do so well. Maxwell Fry discusses "the future of architecture," Miss Tyrwhitt "Town Planning," Miss Drew "Housing," Christopher Tunnard "Landscape architecture in America," G. A. Jellicoe "a philosophy of landscape," Herbert Read "the present state of design and its relation to the industrial system," William Allen "the relationship between science and architecture" and also acoustics, and experts in each subject describe the present state of technology in construction, materials and mechanical equipment.

If Miss Drew can keep this up she will be providing an invaluable summary of the æsthetic and technical state of British architecture year by year and the job will be well worth doing on that account alone. But the year book was not, certainly, produced to please posterity, so the question must be asked, how far it meets a need of contemporary architects. The first answer is quite clear: that authoritative and intelligent summary such as this work contains in abundance is of real value and is worth the time the writers have given to it. What Fry, Read, Allen, Arup, Tunnard and the others have to say is worth having, but most readers probably would prefer it in a smaller, handier and cheaper book. And yet we know that as things are it would probably be impossible to get it except by aid of the advertisements.

As a summary the year book is unique in the width of its range over all that appertains to architecture from the fine arts to specialised aspects of building technique. There can be no opportunity in a note of this size to embark on detailed commentary on the individual articles. There is an interesting deliberateness which prevails throughout for which due credit must be given to the editors who obviously have briefed the contributors in a way sufficient to stimulate them all to thoughtful and careful expressions of their knowledge and ideas. There is an equal measure of "straight" fact and ideology—some authors emphasise the factual and scientific approach, others such as Fry and Read the ideological, some, such as Tyrwhitt, both, but the result is a summary of architecture to-day which is enlightening and stimulating and full of hope.

HOUSING AND PLANNING

Housing and the State, 1919-1944, by Marian Bowley. 8vo. viii + 184. Allen & Unwin. 1945. 15s.

REVIEWED BY COLIN PENN [*A.*]

Dr. Bowley's careful study of house production between the last wars is almost entirely historical, but it has valuable lessons for the future. It is to be hoped that it will be read by all who have to shape our housing policy in the years to come.

The author shows that policy in the period under consideration was based on no carefully thought-out principles. Nor was it a series of intelligent experiments. It consisted rather of a series of expedients intended to overcome difficulties understood only incompletely.

At the end of the 1914-1918 war State responsibility for the provision of housing was looked on as a regrettable necessity, brought about by the lack of building during the war. The shortage of dwellings had made rent control necessary, but it was hoped that after a brief period of building by the State, control could be removed and the provision of housing left to private enterprise, as in the past. In fact it was never possible to end rent control, and the great majority of the working class continued to live in their out-of-date houses because the new ones were quite beyond their means.

When the great depression brought an economy campaign, emphasis was shifted to slum clearance and the relief of overcrowding, and the prospect of a general raising of standards for working class housing was indefinitely deferred. Now that it is again on the order of the day we must realise that it implies not only building high standard dwellings for those who have none, but the replacement of all the obsolescent housing of the country by accommodation of the new standard.

Perhaps the outstanding conclusion to be drawn from Dr. Bowley's book is that the traditional Ministry of Health policy of persuading local authorities rather than directing them, has proved a failure. Changes in Government housing policy were not reflected, as it was hoped they would be, in the performance of the authorities. When some councils were expanding their output, others in similar circumstances would be cutting down. Few authorities seem to have had any idea of planning a long-term programme, and their production figures show surprising fluctuations from year to year. There is a strong case for firmer control and clearer direction on the part of the Ministry.

In spite of these and other weaknesses on the part of local authorities, Dr. Bowley's work must, however, be considered a strong argument in favour of the bulk of our housing programme being allotted to them rather than to private enterprise. She points out that private enterprise has provided houses for those alone who can afford to pay for them. During most of the period under consideration Government policy was intended to encourage private enterprise and to restrict local authorities, with the results we have seen. Moreover houses built by private enterprise are more expensive than houses built by the State, because the State can raise money more cheaply.

The cost of housing subsidies is sometimes used as an argument against the provision of houses by the State. The question, however, is not which agency should provide the houses, but whether the working class are to get them at all. Subsidies are necessary if the working class is not to live in slums; furthermore, as the author points out, the actual cost to the exchequer of subsidies in the past has been remarkably small—the cost of the Chamberlain and Wheatley subsidies was in 1936 equal to about 1.8 per cent. of the income tax and super tax and estate duties.

The final section of the book deals with unsettled questions of housing policy. These are, the purpose of policy—sanitation or general replacement; and the rent question—ability to pay, local rates, and subsidies.

Dr. Bowley's style is not particularly attractive: she is cautious of making recommendations, she seems a little cynical on such matters as the possibility of a considerable raising of standards, but readers will find no difficulty in drawing their own conclusions. No student of housing policy can afford to neglect this book.

Portrait of a City's Housing. By B. Seebohm Rowntree. Rebuilding Britain Series. No. 13. 8vo. 54 pp. Faber & Faber. 1945. 2s.

Mr. Seebohm Rowntree has contributed two of the most fundamental social studies of housing yet made in Britain, *Poverty, a Study of Town Life* (1899) and *Poverty and Progress* (1941), both relating to his own city of York.

The present book includes the housing chapters of *Poverty and Progress* and a synopsis of the other parts. The chief lesson of this portrait is that the housing problem is part of the great social problems of poverty and want.

York is a city of 6,456 acres, housing 100,800 people at an overall density of 15·61 per acre. The main industries are the cocoa and chocolate works of the Rowntree family and the railway. The basis of the study was a house-to-house enquiry to reveal the conditions of households, the workers' occupations and sources of income and facts about the houses—to reveal a complete and detailed picture of all the conditions affecting the lives of the working-class population. While this study was being made another was made of the incomes necessary to secure for families the essentials of a healthy life.

Mr. Rowntree separates the houses into five categories, ranging from "Post-war semi-detached private-enterprise houses with their new standard of comfort and amenity" to slum houses. The plans of several typical houses are illustrated, and each category is described in detail. In connection with category 2—council houses—he notes that "unfortunately, save in the case of 250 houses, little or no attention was paid to aspect," and "it is perhaps invidious to criticise the elevations . . . however, . . . anyone familiar with estates where the houses have been designed by first-rate architects . . . would place the York houses in the second class." The City Surveyor, a civil engineer, was in charge of the lay-out and design. The description of the houses is followed by analyses of cost and rent, both considered in relation to family income and the class of tenant, which reveals the fundamental interrelation of house and family income and the difficulties which result from the transference of families from slums to new houses without change in income or social opportunity.

In addition to the five main categories certain special types of tenements, back-to-back houses and lodging houses are considered.

In a chapter on overcrowding Mr. Rowntree states varying standards; he notes that the 1935 official standard, taking no account of room sizes, showed 1,959 persons overcrowded, whereas under a more stringent but entirely reasonable standard 8,554 persons could be described as crowded, or 15·5 per cent. of the working-class population.

The general picture is none the less one of improvement; in 1900 26 per cent. were in slums, in 1936 11·7 per cent.; in 1900 5·7 working-class families lived more than two to every room; in 1936 the percentage was 1·7.

But among the most significant facts that remain is that in this cathedral city 1,7[illegible] *families* would have had insufficient income to meet the minimum requirements of a healthy life even if they paid no rent at all. The private-enterprise houses were rented at an average of 15s. 9d., a fact related to the other facts which, as the editor points out, shows that private-enterprise housing, however valuable to the middle classes, was of little value to the working-class population.

Planning and Transport: Their Effects on Industry and Residence, by Walter Segal. 8vo. 90 pp. Dent (for Co-operative Permanent Building Society). 1945. 3s. 6d.

This is an addition to the Building and Society Series edited by Dr. E. C. Fairchild. The author's main consideration is of the principles and uses of zoning as applied to existing towns. Four principal classes of urban land are recognised on the basis of the occupation of the inhabitants; centres of production of raw materials; centres of manufacture, commerce and distribution, and centres of organisation, representation and consumption. The first chapters discuss the nature of town growth and the increasing complexity and unreasonableness which results from the necessity of finding space for new activities and new quantitative growth in the inflexible pattern of an old town. The nature of growth and the tendencies and "pulls" of the various urban activities and interests are illustrated by a series of diagrams which are used, also, to illustrate the principles of zoning or reassortment always involved in planning.

From these general considerations Mr. Segal passes to the traffic problem: the satisfactory application of zoning depends largely and often ultimately on good communications. The replanning of traffic routes he sees as a slow process largely because of the conservatism of urban populations where any interference with an existing road pattern is concerned. The various town patterns, including the lineal city, are described: the interrelation of linear, radial and ring systems and road classification according to speeds of traffic, the nature of the user, etc., are studied, with special consideration given to the segregation of mechanised from other forms of transport.

The latter half of the book deals generally with other problems of land subdivision in terms of interrelation of use, orientation and light and air, densities and economy. One chapter deals with the subdivision of building blocks, discussing principally the patterns suitable for residential areas. The same chapter analyses development cost in terms of various lay-out patterns and road widths.

The book in common with others in the series is chiefly intended for laymen, local authority committee men and the like, but no architect who knows of Mr. Segal's rare powers of analysis of planning and housing lay-out and design will need to have it suggested that the book is well worth having.

Cost Measurement in Urban Re-development. By Miles L. Colean and Arthur P. Davis for National Committee on Housing, Inc. 4to. 43 pp. + folded tables. New York. 1945.

The foreword by Mrs. Rosenman, chairman of the N.H.C., states that in the competition between the various parts of a city for means, financial and other, to develop and improve, the older sections are at a disadvantage because of the cost of re-assembling small parcels of land and removing existing structures, also the acquisition costs of worn-out areas are generally more than those of outlying areas. These disadvantages must be overcome if cities are to be rebuilt in a balanced way and more than merely peripheral improvements effected. This study by Colean and Davis is an important attempt to analyse the elements of cost and especially the cost of land in relation to rebuilding of blighted urban areas. Two main questions appear: how high a rent must be obtained to support a satisfactory rate of return and how great a rate of return may be expected from an estimate of market rent. The price of land, density of development and the type and quality of building are all involved.

The main part of the book consists of detailed tables on large folding plates demonstrating the interaction of the various rent, land cost, type of development factors. Similar analyses are made for one family detached houses, two-storey "group" houses, and three, six and twelve-storied flats. The figures and the real estate conception are of course American.

The study shows the extent to which certain cost elements affect the total picture and thereby indicates the points at which effective reform can be applied. Land cost is shown to be the most critical element not only in rent but also in settling the building type.

BUILDING CONSTRUCTION MATERIALS AND EQUIPMENT

Mechanical and Electrical Equipment for Building, by Gay & Fawcett. 2nd edition. 8vo. vi + 453 pp. and folding diag. N. York, Wiley; London, Chapman & Hall. 1945.

REVIEWED BY J. H. MARKHAM [*F.*]

The recent intensive review of all phases of building practice, instituted in this country under Ministerial direction and published in a series of Post-War Studies, has shown in general that improvement and progress is to be expected, not so much in new structural methods and materials, but rather in better and more efficient installations. This imposes on the architect the necessity of becoming acquainted with the higher standards now to be attained, and also with the appliances and equipment by means of which realisation of the standards is to be assured. Manufacturers on the other hand can be relied on to make available the appliances and materials required.

The book under review deals with water supply, plumbing and drainage, heating and air conditioning, electrical equipment and acoustics. The matter is presented in textbook form; and where scientific principles and physical processes are elaborated, the treatment is suited to students and others in all countries. On the other hand, where methods of practical realisation are in question it must be admitted that American practice differs considerably from that which is customary or proposed in this country.

It is well that technicians should have some knowledge of the way in which their problems are solved in other countries, and that they should be prepared to amend their own methods where useful lessons are to be learned from others; but climatic and other conditions vary so much that no universally accepted practice in building installation and equipment is to be expected. Moreover, instances abound of differences in practice or in form of appliance which are due to custom and in no way the result of climatic or local requirements, and the student or technician in Britain using this book must be on his guard in this respect.

Improvements in building technique involve not only the use of more efficient and economical appliances but changes in the fabric of the building to ensure that the increased efficiency of the apparatus will not be wasted. This is particularly true in regard to heating, where more efficient appliances must be accompanied by an adequate thermal insulation to prevent heat losses. In dealing with the acoustics of buildings there are two main problems—neither of which involves apparatus or an installation. One is the design of auditoria to ensure the proper control and distribution of sound: this is a question of relative disposition of planes and appropriate location of reflectant and absorbent material. The other is entirely one of insulation to prevent sound passing where it is not desired. A short chapter at the end of the book deals briefly with these problems; and in the chapters on Heating the methods of calculating the insulating value of walls, ceilings and roofs of different forms and combinations of materials are explained, though the co-efficients for the various materials do not seem to be the same as those adopted in this country.

In electrical installation work there is probably much more uniformity of practice throughout the world than in other types of installation; and electrical work—including lifts, escalators, lighting, etc.—occupies two-fifths of the volume. Even here, however, standards of lighting intensity do not seem to be the same in this country and America.

In the section dealing with water supply, the ball-valve, so universally used in this country, seems to have no place as controlling inflow of water to tanks. The very high buildings common in American cities necessitate a system of "zoning" as regards water distribution in the building to obviate the necessity of having inconveniently large tanks.

The section on heating and air conditioning deals exclusively with systems of central heating; nothing is said about the heating of individual rooms by local heaters consuming fuel in the room which is the customary method, at present, for domestic buildings in this country. Possibly a larger use of central heating methods in houses will be one of the ways in which we might with advantage follow to some extent the American lead.

Kunslicht und Architektur. By L. C. Kalff. In series: Philips technische Bibliothek. La. 8vo. 299 pp. Philips Gloeilampenfabrieken. Eindhoven. Holland. 1943.

This book, which has reached the library through the kindness of an R.I.B.A. student, Mr. F. G. Masters, serving in the Air Force in Holland, has the incidental interest that it is a Nazi product of the famous Philips lamp and radio firm at Eindhoven during the war. More essentially it is probably the most complete book on artificial

lighting that has come to the library. The first section deals with the fundamental properties of light and with optics: the next sections with the art of lighting and the fundamentals of lighting technique. In succession the chapters following deal with lamps—including mercury arc and other types; the reflective values of surfaces, transparency and refractive values of transparent and translucent materials; the design of lamp fittings with regard to their technical efficiency, including architectural lighting round cornices and lay-lighting. Concluding the first and mainly technical part of the book is a chapter on the calculation of light requirements in relation to fittings and equipment provision.

The latter two-thirds of the book, pp. 86 to the end, contains detailed analyses of light requirements and provision in offices, dwelling houses, public buildings, including shops, churches, picture galleries and exhibitions, concert halls and theatres, restaurants, libraries and a special chapter is given to ships. Two concluding chapters deal with external lighting and flood lighting.

Arkhitekturnye Konstruktsü (architectural construction). Akademii Arkhitekturi S.S.S.R. 8vo. 744 pp. Moscow. 1940.

This is the standard textbook on building construction used in Soviet building practice and in architectural and building schools. Like all educational and cultural material in the field of architecture it is published by the Academy of Architecture—now outstanding among the world's architectural learned societies. No direct comparison can be made with any existing British textbook since it covers a rather wider field and is designed to meet somewhat different needs with a view to those of the practitioner rather than the student. It proceeds not from elementary concepts and methods to more advanced but from foundations to superstructure to coverings, partitions, windows and doors. The first chapter, thus, deals with soil mechanics and foundation design of large as well as small structures, and covers also retaining walls, areas and basements. The second section is on masonry walls, including all the types used to provide the great classical façades of contemporary Soviet city buildings and several forms using terra-cotta, etc. This section also deals with prefabricated wall units, blocks, and prefabricated units. The section on timber building is of particular interest even if of limited relevance to British architects in showing in detail the various methods of log and heavy timber construction still widely used in the U.S.S.R. for non-urban building; light framed structures also are shown and all the methods of sound, heat and fire insulation. Subsequent sections deal with sloping and flat roofs, stairs and stairways and escalators, doors and windows and partitions.

The illustrations are numerous and good.

Elements of Technical Science. By A. Spencer White. Sm. 8vo. vi + 325 p. Dent. 1945. 4s. 3d.

The author, who is head of the science department of Bournemouth School, states that his aim has been to provide a two years' course in science for building and other technical students. The book will be useful to many architectural students, though in some respects it goes beyond the science requirements of architectural school curricula and in others does not provide sufficient information on applied science to help an architect in his main problem—design. This is the chronic deficiency in most available literature that the practical business of design and the elements of "construction" and the background science are unco-ordinated. The first chapters deal with measurement of lengths, areas and solids, the elements of force, density and pressure, molecules, surface and capillary tension. The next section contains the elements of simple mechanics, work, machines and power; the next with heat, and, successively, the remaining chapters deal with the chemistry of air and water and building stones, with light, sound, and the elements of electricity, and finally with wood plastics and alloys.

A Handbook of Empire Timbers. Forest Products Research Laboratory of D.S.I.R. 8 vo. viii + 142 pp. Revised Edition. 1945. 6d.

This is a revised edition of a standard book of reference first published by the Empire Marketing Board in 1932.

The book is essentially a book of timber facts: in all ninety-six hardwoods and twenty-eight softwoods are described under the following heads: Name (common and botanical); the tree (description of appearance); the timber—general description; seasoning properties; wood bending properties; mechanical properties: natural durability, insect attack; preservative treatment; working qualities; uses and supplies.

The introduction contains useful notes enlarging on the terminology used in the descriptions.

This unquestionably is a reference book which every architect should have. Copies are in the Lending Library.

Catalogue of Swiss Trade Products. Vol. I. House and Building Materials. Vol. II. General Accommodation. Sm. f°. 195 and 214 pp. Zurich. Swiss Union of Trades and Crafts, Export Department. 1944.

Haanbog for Bygnings-Industrien (11th issue). 4to. 756 pp. Copenhagen. 1945.

Through the courtesy of the Swiss Legation in London the Library has recently received two folio volumes of the Building Materials and Equipment volumes of the catalogue of Swiss Trade Products issued by the Swiss Union of Trades and Crafts.

The value of this catalogue lies in its detailed illustration of materials and commodities currently used in a country which has always been notable for the high quality of its building and which has at present the advantages due to its freedom from active warfare during past years.

Volume one has sections on "Buildings"—prefabricated house types and huts; "Building Materials and Components"—hollow blocks, building and insulation boards, glass bricks, roofing materials, drainage materials, etc.; "Windows and window fastenings"—a section of particular interest in view of the established reputation of Swiss light weight wood frames; "Doors and door fittings"; "Flooring"; "Building machines and tools" for factory and on-the-site use.

Volume two illustrates "general accommodation," i.e., all items of household interior equipment for kitchens, heating, washing, sanitary installations, lighting and furniture. Both volumes are made up of illustrations, apparently cut out from individual traders' lists, and mounted neatly on the pages of the volumes.

The Danish volume is a more complete presentation in so far as it includes technical information, addresses and sizes to a far greater extent than the Swiss lists. Danish commodities, as the Swiss, show a remarkably high standard of design. The *Haandbog* also has sections listing institutions, firms, architects, surveyors, etc.; building regulations, including technical articles on hygiene, electrical installations, sound insulation. A section of useful dimensions includes "data sheets" of official Danish standards for building equipment, installations, structures and diagrams of the sizes of common household equipment and furniture. The final section contains a valuable collection of conversion tables, symbols and mathematical data. There is probably no more comprehensive year book of its kind available and some English publisher might do well to follow this example.

The Architect's and Builder's Compendium. 49th year. 4to. 1945. 2 guineas.

The 1945 issue of the Compendium has been published following the same lines as hitherto. The main contents are the classified index to the materials and services advertised in the body of the volume, a list of trade names and a useful collection of information relating to the Ministries and the Acts and regulations affecting building; Mr. W. T. Creswell contributes legal notes on the principal current Acts, etc., and abstracts more important cases heard during the war. The volume ends with lists of architects and builders arranged by locality.

Trade Drawing for Juniors' Technical Schools of Building, by E. G. Warland. 8vo. 154 pp. Hodder & Stoughton for English University Press. 1944. 5s.

This is an elementary book on plane geometry, the graphic presentation of building elements and forms of projection. The drawing technique is of the kind used to illustrate textbooks rather than serve the practice needs of architects.

The New Builders' Handbook on Brickwork and Drainage, by E. J. Ward and A. Vollor. 8vo. 108 pp. 1945. 5s.

No. 1 in a series *The New Builders' Handbooks*, edited by I. R. Vesselo, this is a very slight work intended for bricklayer trainees. Design problems are dealt with in brief text and illustrated simply.

HISTORY AND ANCIENT BUILDINGS

Salving the Art Treasures of the Church. 9th Report of the Central Council for the Care of Churches. 8vo. 60 pp. Press & Publications Board of Church Assembly, 2 Great Peter Street, Westminster. 1945. 2s. 6d.

This, the most interesting report yet issued by the Central Council, is a reference book of value for its record of war damage which though necessarily brief and far from complete, summarises the amount the Church has suffered. As usual the Report records and illustrates good and bad restoration and emphasises, as before, the care needed in treating a church wall. Mr. F. C. Eeles, the general secretary, con-

tributes a five-page technical article on the subject in which he arraigns the Victorians who dealt so cruelly with mediæval wall surfaces, describes the various surfaces used by the original builders and briefly notes the best methods of treatment and repair. There are two other technical appendices by Mr. Bagenal on loudspeakers and acoustic problems and by Mr. C. J. Robb on the restoration of ancient plaster ceilings. There is an excellent bibliography of books and pamphlets on the care and restoration of churches.

English Church Design, A.D. 1040-1540 by F. H. Crossley. 8vo. 120 pp. + pl. 1945. Batsford. 12s. 6d.

This further publication on the inexhaustible topic of English mediæval church architecture is justified by its main theme—the detailed study of the design of various features, towers, façades, and so on. In addition, it gives much information on local variations, and so helps to anticipate the long-awaited posthumous work of F. E. Howard on this subject. The chronological divisions dear to the Victorian mediævalist are less prominent, broad indications of centuries occuring only within the studies of the separate features, though an outline is given of plan growth in the seventh chapter. Perhaps the freshest contribution is the chapter on the Organisation of mediæval building, with subheads Craftsmen, Materials and Transport. The glossary is useful, though the definitions are not always grammatically related to the terms; and the index is of the usual Batsford type, illustrations being referred to by figure (not by page) numbers—an arrangement easier for the compiler than for the reader. The supply of fresh photographs, common to all Batsford books, makes this a good book for the laymen, but the architect and architectural student will find it an absorbing study. H. V. M. R.

Some Hints on the Maintenance and Repair of 17th and 18th Century Premises. York Georgian Society Pamphlet No. 1. 8vo. 16 pp. York, 77 Scarcroft Road. 1945. 2s.

This is a fine constructive display of civic pride. York has a distinguished collection of architecturally notable town houses, almost all of which—as is usual—have been damaged by inappropriate changes to their roofs, windows, wall surfaces or colour; damage due often to a wanton disregard of every canon of civic taste and architectural history, but often, too, due to the sheer ignorance of people who ought to have known better.

The York Georgian Society Pamphlet attacks both the wantons and the ignoramuses quietly and efficiently by showing what faults have been allowed, and describing in the text what treatment of old buildings is "correct"—there *is* a correctitude in these matters and it could hardly be presented with more reason and less pedantry than by Mr. Braxton Sinclair and Mr. J. H. Rutherford, Mr. C. W. Needham, Mr. J. Stuart Syme, and Mr. C. R. Thorp, who shared with Mr. Sinclair in the preparation of the pamphlet.

Report on Cheltenham, by the Georgian Group. 8vo. 16 pp. Georgian Group, 4 Hobart Place, S.W.1. 1945. 2s.

"Urbanity" is the fashionable town planning and architectural tag of merit—whatever it may mean, and the virtue of the word is its stimulating vagueness. Cheltenham has it in abundance and deserves the urbanely assured attention of the Georgian Group. Their small pamphlet in form of presentation and contents is a model which they or others should repeat elsewhere. It is simple, direct, accurate and sympathetic.

After an historical description, in which, curiously enough, no mention is made of J. B. Papworth, the group tables its recommendations. Buildings listed in an appendix should be preserved on account of their outstanding architectural merit and a second list of churches and public buildings deserves "most careful and sympathetic consideration in relation to rebuilding projects"; few of these buildings actually come within scheduled clearance areas. Otherwise they recommend among other things that the plan formality should be followed in new layouts; stucco stone and plaster as materials are to be preferred to brick; requisitioned railings should be restored, regency houses unsuited for modern ways and purses should be converted and their physical appearance retained. There are several excellent photographs.

Specifications for Roads. 8vo. 1945. **Model Specification for Roads.** 4to. 1945. Issued by the Federation of Coated Macadam Industries and the British Road Tar Association.

A reprint of four specifications: (1) For hardcore foundations and single-course tar macadam surfacing (housing), prepared by the Institution of Municipal and County Engineers. (2) British Standard specification for tar macadam and tar carpets (B.S.S. 802: 1945). (3) British Standard Specification for tar-paving (B.S.S. 1242: 1945). (4) Model specification for roads using pitched or hardcore foundations and rolled asphalt or single-course bitumen surfacing, issued by the Institution of Municipal and County Engineers.

These can be obtained free by architects from the Federation of Coated Macadam Industries, 37 Chester Square, London, S.W.1.

Architecture, by Edward D. Mills, in Ross Careers Series. Sm. 8vo. 55 pp. Robt. Ross. 1945. 2s. 6d.

Mr. Edward Mills [*A.*] has compiled a direct, short guide to the architectural profession which answers all the questions commonly asked by boys and girls thinking of coming into the profession and by the careers masters and mistresses in schools who have to answer the enquiries and guide their students into active life. The opening chapters describe the architect's job in the community and the variety of abilities which can find scope in the profession. This is followed by the professional code of practice as the most concise presentation of the character and status of architect. The educational system, the schools, including their fees, examinations, registration and the question of employment and salary scales are dealt with successively, and at the close is a good bibliography of books for the general public.

Contemporary Shops in the United States. By Emrich Nicholson. 4to. 192 pp. Architectural Book Publishing Co., New York. 1945. $10.00.

The beautiful well-stocked shop is a thing of memory rather than present experience in Britain, and this lavish assembly of American work cannot yet have any very direct association with work in this country. None the less it is a valuable contribution to the small amount of literature on the subject. The presentation follows the usual lines of books on types of buildings; photographs, brief descriptions and plans of a considerable number of buildings, but not of all. George Nelson contributes a five-page introduction.

Accessions to the Library

1945-46—I *concluded*

BUILDING, MATERIALS, *concld.*

Inf. file 691.713

OFFICIAL ARCHITECT AND PLANNING REVIEW, *journal*
[Special issue :] Cast iron number. (May.) [Arts. by John Summerson and others.]
$11\frac{1}{4}''$. Lond. 1945.
Separate copy. Presented by Mr. John Gloag.

BRITISH STANDARDS INSTITUTION 69 (083.74) box
B.S :
691.714
405 : Expanded metal (steel) for general purposes.
1945. 2s. R.

CONSTRUCTION, INCLUDING PREFABRICATION

MINISTRY OF WORKS 693.061 A/Z
* A Survey of prefabrication. By D. Dex Harrison, J[essica] M. Albery, and M[uriel] W. Whiting.
ob. 8″ × 13″. replica typescript and illus. (ii) + 72 + xi pp. + pls. (unnumbered), one folding + slip (key), loose. [Lond.] 1945. *Presented by the Ministry* (4).

BRITISH STANDARDS INSTITUTION 69 (083.74) boxes
B.S. :
693.068.2 : 693.51
492, 728 & 834 : Precast concrete blocks. . . . 492. Solid partition blocks. . . . 728. Hollow *do.* . . . 834. Blocks for rendered walls.
Lond. 1944. 2s. R.
B.S. :
693.068.32 : 691.214.2
680 : Roofing slates.
Lond. 1944. 2s. R.
B.S. :
693.068.32 : 693.51
473 : Concrete plain roofing tiles and fittings.
Lond. 1944. 2s. R.
B.S. :
693.068.34 : 691.73 : 696.1
659 : Light gauge copper tubes for water, gas and sanitation.
Lond. 1944. 2s. R.

B.S. :
693.068.34 : 693.51 + 696.12 : 693.51
536 : Concrete cylindrical pipes and fittings, including manholes, inspection chambers and street gullies.
1945. 2s. R.

B.S. :
693.068.34 : 693.54 : 696.1
1211 : Centrifugally cast (spun) iron pipes for water, gas and sewage.
Lond. 1945. 2s. R.

B.S. :
693.068.39 : 693.54
417 : Galvanised mild steel cisterns, tanks and cylinders.
Lond. 1944. 2s. R.

HODGE (J. C.) 693.2
* Brickwork for apprentices.
9¼″. 180 pp. text illus. Lond. : Arnold. 1944. 6d. R. (2) & P. (2).

WARD (E. J.) *and* VOLLOR (A.) 693.2 + 696.12 : 728
(On) Brickwork and [house] drainage. (The New builders' handbooks, *series*, i. I. R. Vesselo, gen. edr.)
7¼″. 108 pp. text illus. Lond. : Geo. Allen & Unwin. 1945. 5s. R.

FABER (OSCAR) 693.54
*Constructional steelwork simply explained.
Reprint. 8½″. 120 pp. text illus. Oxford & Lond. : U.P. 1927 (1937).
Transferred from Prisoners of War Book Scheme. To Loan Library.
Earlier reprint in Reference and Loan Libraries.

FLEMING *Bros.* 693.54 (083)
(Section book) [steel].
44″. (i) + xv + 620 + (i) + (viii) pp. + folded pls. + endpapers. Glasgow. 1944. gratis. R.

REINFORCED CONCRETE ASSOCIATION 693.55 (06)
A Review of recent progress.
8½″. 23 pp. Lond. : the Assn., 94, Petty France. 1945. 1s. 6d.
Presented by the Association (2).
693.55 : 621.791.5
Technical papers :
No. 2. Welding in reinforced concrete construction. By J. Cuerel. A paper *&c.*
8¾″. 43 pp. text illus. Lond. 1937. 2s. 6d. *Presented.*

BRITISH STANDARDS INSTITUTION 69 (083.74) box
British standard code of practice : (Codes of Practice Committee (Ministry of Works).)
693.6 : 691.551
CP : . . . Lime plastering. General series code 2.22. (Draft for comment. 2nd proof CP (B) 483.)
1945. 2s. R.
693.61
CP : . . . Preparation of surfaces to receive plaster. General series code 2.21. (Draft for comment. 2nd proof CP (B) 482.)
1945. 2s. R.
693.621
CP : . . . Internal plastering. General series code 2.2. (Draft for comment. 2nd proof CP (B) 481.)
1945. 2s. R.
693.625
CP : . . . Cement finishes. General series code 2.24. (Draft for comment. 2nd proof CP (B) 484.)
1945. 2s. R.

B.S. :
69 (083.74) boxes
694 : 693.068.882
1210 : Dimensions of mild steel and brass woodscrews.
Lond. 1945. 2s. R.

B.S. :
694.6 [69.08 : 389
1186 : Grading of softwood joinery.
Lond. 1944. 2s. R.

SANITARY SCIENCE AND EQUIPMENT

BLAKE (E. G.) 696.1
*Plumbing. A text-book *&c.* (Technical Press manuals, *cover series titles*).
2nd ed. 2 vols. : i Lead laying, gutters, etc. ; ii sanitary appliances. Lond. : Technical Press. 1935.
Transferred from Prisoners of War Book Scheme (2 sets). *To Loan Library.*
1924 ed. in Reference and Loan Libraries.

(series) 69 (494)
shelved 696.1

SWITZERLAND : DELEGIERTE FÜR ARBEITSBESCHAFFUNG
Schriftenreihe zur frage der arbeitsbeschaffung [executed works] :
Bautechnische reihe [series] :
Nr. 3. Bauen in kriegszeiten. Sanitäre installationen. [By] Hermann Meir and H. Liebetrau.
11¾″. 24 pp. text illus. Zürich : Polygraphischer. [1942.]
Presented through the British Press Attaché Berne.

MINISTRY OF HEALTH Inf. file 696.11 : 69.029 (083.74)
Water fittings. British standard specifications. (Circular 118/45.)
leaflet. dupl. typescript. 8¾″. × 7″. 1945. R.

BRITISH STANDARDS INSTITUTION 69 (083.74) boxes
B.S. :
696.12 : 693.068.34
416 : Cast iron spigot and socket soil, waste and ventilating pipes fittings and accessories.
Lond. 1944. 3s. 6d. R.

B.S. :
696.121
1205 : pt. 1 : Cast iron gutters, fittings and accessories. Pt. 1 : Half round gutters.
Lond. 1945. 2s. R.

B.s :
696.129
504 : Drawn lead traps.
1944. 2s. R.

B.S. :
696.15 : 691.4
1188 : Ceramic lavatory basins. *&c.*
Lond. 1944. 2s. R.

B.S. :
696.15 : 693.53
1189 : Cast iron baths for domestic purposes *&c.* [Corrected from 1206.]
Lond. 1944. 2s. R.

B.S. :
696.164 : 691.4
1213 : Ceramic washdown w.c. pans *&c.*
Lond. 1945. 2s. R.

IBBETSON (W. S.) 696.6
Electric wiring theory and practice *&c.*
8th ed. 7½″. viii + 264 pp. Lond. : Spon. 1944. 10s.
Conforming to I.E.E. Regulations, 11th ed., 1939.
Transferred from Prisoners of War Book Scheme.
4th ed. 1935 in Reference Library.

BRITISH STANDARDS INSTITUTION 69 (083.74) box
B.s :
696.6 : 72.092
1183 : Space required for domestic electrical appliances.
1944. 2s. R.

(series) 69 (494)
shelved 696.9 + 69

SWITZERLAND : DELEGIERTE FÜR ARBEITSBESCHAFFUNG
Schriftenreihe zur frage der arbeitsbeschaffung [executed works] :
Bautechnische reihe [series] :
Nr. 4. Bauen in kriegszeiten. Heizung und lüftung [heating and lighting]. [By] H. Lier and H. Liebetrau.
11¾″. 24 pp. text illus. Zürich : Polygraphischer. [1942.]
Presented through the British Press Attaché in Berne.

LUCKIESH (MATTHEW) 696.9 : 535
Light, vision and seeing. A simplified presentation of their relationships and their importance in human efficiency and welfare.
Reprint. 8½″. xiv + 323 pp. + xvi pls. + pl. inside cover. New York : Van Nostrand. 1944 (1945).

ALLEN (WILLIAM) Inf. file 696.92
Illumination. [Natural light calculation.] (*From* Specification. *annual*, 1945.)
12″. 8 pp. n.p. [1945.] *Presented* (2).

BRITISH STANDARDS INSTITUTION
British standard code of practice : (Codes of Practice Committee (Ministry of Works).)
696.934 : 728.8
CP : . . . Gas lighting. Single family dwellings. General series code 3.4231. (Draft for comment. 3rd proof CP (B) 479.)
1945. 2s. R. (2).

JOHN B. PIERCE FOUNDATION, *New York* 697 [691 : 697.147
Educational series : (Research study, *cover top title* :)
No. 1 (*cover*) :
Summer comfort factors as influenced by thermal properties of building materials. By C. O. Mackey and L. T. Wright, jr.
11″ × 8½″. 27 pp. text diags. New York. 1943. R.

NEWCOMBE (S. F.) Inf. file 697 : 728.86
Domestic heating for small houses. (*In* Coke and Smokeless-Fuel Age *journal*, Aug.)
extract. 11½″. 1945.
Presented by Col. Newcombe, the author.

STEAM ENGINEER, *journal* 697.34 (73) + 697.34 : 016
District heating in the United States of America Reprints of articles . . . May, 1937, to January, 1938, inclusive. [By D. H. Little and others. With bibliog. of arts., 1934 May—1941 Mar.]
11″ × 8¾″. 31 pp. text illus. Lond. : Troup. [1941 or later.] 5s. P.

BRITISH STANDARDS INSTITUTION 69 (083.74) box
British standard code of practice : (Codes of Practice Committee, *&c.* (M.o.W.).)
697.4 : 696.2] 728.1
CP : . . . Hot water supply by gas for single family dwellings. General series code 3.4232. (Draft for comment. . . . 2nd proof CP (B) 489.)
1945. 2s. R.

Inf. file 697.8 : 620.193.53] 711.5
NATIONAL SMOKE ABATEMENT SOCIETY
Smokeless zones.
8½″. xi + (iv) pp. text illus. Lond. 1945. 3d. R.

BRITISH STANDARDS INSTITUTION
British standard code of practice : (Codes of Practice Committee (Ministry of Works).)
697.81 : 696.2
CP : . . . Flues for gas appliances. General series code 3.4236. (Draft for comment. 3rd proof CP (B) 480.)
1945. 2s. R. (2).

69 (083.74) boxes
BRITISH STANDARDS INSTITUTION 698.3
B.S. :
973 : B.s. code of practice for the Glazing and fixing of glass for buildings.
Lond. 1945. 2s. R.

PROOFING

699.815
BUILDING INDUSTRIES NATIONAL COUNCIL : ADVISORY COMMITTEE ON BUILDING ACTS AND BYELAWS
* Report on means of escape in case of fire.
9¾″. (i) + 41 pp. (sticker on p. 41). Lond. 1945. R. (2).

699.85
U.S. : DEPARTMENT OF COMMERCE—NATIONAL BUREAU OF STANDARDS
N— B— of S— Handbooks :
H40. Code for protection against lightning. Parts i, ii, and iii. (Supersedes H 21.) Approved by the American Standards Association : . . . 1937, . . . 1944.(A.S.A. C5. 1—1937, C5. 2—1937, C5. 3—1944. *rubber-stamped.*) ([Contents] : C5. 1, C5. 2, C5. 3, *label inside cover.*)
7½″. x + 99 pp. + double pl. text diags. Washington : Supt. of Documents. 1945. (20 c.) P.

PITTS (G. YATE) 699.86
The Thermal insulation of structures.
7¾″. x + 181 pp. text diags. Lond. : Griffin. 1941. 10s. P.

(A.R.P., WAR DAMAGE, INCLUDING REPAIR)

699.895 : 623 box
699.895 : 623.77
AIR MINISTRY : R.E.8
Notes on the recognition of industrial building structure from air cover.
dupl. typescript. 13″. [1945.] *Presented.*

BURKE (JOHN), *editor* 699.895 : 72.025.1] 34
[Loose-leaf] Encyclopædia of war damage and compensation.
Suppl. pt. 19. Harold Parrish, ed.
[1945.] 6s. P.

(series, one set) 699.895 : 72.025.1] 69.059.2 box
(dupl. set) 699.895 : 72.025.1 arch file
(copy under subject)
DEPARTMENT OF SCIENTIFIC & INDUSTRIAL RESEARCH : BUILDING RESEARCH
Repair of damaged buildings. Notes :
69.024 : 694] 69.059.2 + 69.025.3 : 694] 69.059.2
No. 6. Repairs to timber roofs and floors. (In collabn. with Forest Products Research.)
1945. R. (3).
691.11 : 620.193.83
No. 9. Eradication and prevention of dry rot. (By Forest Products Research.)
1945. R. (3).
698.1 : 729.098
No. 11. Re-decoration of walls and ceilings.
1945. R. (3).
693.2 : 69.059.2
No. 12. Repairs to brickwork.
1945. R. (3).
69.023.941.5 : 69.059.2
No. 13. Reinforced concrete columns damaged by explosion.
1945. R. (3).
699.895 : 623.77] 620.197.8
No. 16. Removal of camouflage coatings, blackout paints and anti-scatter treatments.
1945. R. (3).
699.895 : 72.025.1 arch file
MINISTRY OF HEALTH 699.895 : 72.025.1] 728 : 69.059.2
Repair of war-damaged houses, and other housing work, London Civil Defence Region. (Circular 131/45.)
leaflet. dupl. typescript. 8¾″ × 7″. 1945. R.

ENGINEERING

TANGANYIKA *territory* 62 : 354 (678) + 69.03 : 551.566.2 (678)
Field engineering. A handbook on simple construction. By F. Longland.
2nd ed. 7¼″. vii + 162 + (i) pp. + 38 pls. Dar es Salaam : Govt. Printer. 1942. (Shs. 5s.)
Presented by the Author.
filed individually Inf. file
SOCIETY FOR CURRICULUM STUDY 626 : 628.1 (73)
Building America, *journal* : x, No. 7 : Our water resources. (Apl.)
1945. R.
MINISTRY OF FUEL AND POWER 627.43 (42.41/43)
Report on the Severn Barrage scheme. By A. G. Vaughan-Lee, Sir William Halcrow, [and] S. B. Donkin.
9¾″. 32 pp. + map in pocket. text diags. Lond. : H.M.S.O. 1945.
Presented by the Ministry Library.
627.43 (42.41/43)
ECONOMIC ADVISORY COUNCIL : SEVERN BARRAGE COMMITTEE (*formerly sub-committee of* COMMITTEE OF CIVIL RESEARCH)
Report *&c.* 1933.
Reprint, with 1 plan. 9¾″. 20 pp. + map in pocket. Lond. : H.M.S.O. 1933 (1945.) 2s. 6d.
Presented by the Ministry of Fuel and Power Library.

SOCIAL SCIENCE, INCLUDING ECONOMICS

MUMFORD (LEWIS) 3 : 6
*Technics and civilization.
Reprint. 9¼″. xi + 495 pp. 1934 (1940). £1 1s.
Transferred from Prisoners of War Book Scheme. To Loan Library.

TOPOGRAPHY

COPPENS (MARTIEN) 91 (492)
Picturesque Brabant. 44 photographic illustrations and an introd. *&c.* Trans. by A. Spoorenberg.
ob. 8¼″ × 9½″. xv pp. + pls. Eindhoven : Van Eupen. [1944.]
Leaves pls. 3-4 and 23-4 mutilated ; leaves pls. 9-10 & 11-12 removed.
Presented by Mr. C. A. G. Beacher [*A.*], B.L.A.

TOWN AND COUNTRY PLANNING

MINISTRY OF LABOUR AND NATIONAL SERVICE Inf. file 711
Town planning. (Careers for men and women series, 41.)
8¼″. 12 pp. Lond. 1945. R.
Inf. file 711 (06) (73)
URBAN LAND INSTITUTE, *Washington, D.C.*
The U— L— I—. Its program and services.
8¼″ × 4″. 8 pp. Washington. [1945.] *Presented.*

711 (076) box

TOWN PLANNING JOINT EXAMINATION BOARD (R.I.B.A. *and* TOWN PLANNING INSTITUTE)
Questions set in Final Examination 19 . .
1932-33, 1936-38, 1941, 1943-45—.
12¾″—13¼″. Lond. [1932-45—.]
In progress.

711 (06) T.C.P.A. arch file

TOWN & COUNTRY PLANNING ASSOCIATION 711 (42)
Town planning matters needing urgent attention.
dupl. typescript. 10½″ × 8¼″. 1945. R.
With Press notice, " Combined ops." *&c.*

Inf. file 711 (42) [72.08 : 333 + 711 [72.08 : 347.434

ASSOCIATION OF BRITISH CHAMBERS OF COMMERCE
Memorandum on the Town and Country Planning Bill and the Government White Paper on the control of land use. By A. D. Dean. [Compensation.]
8½″. 8 pp. Lond. 1944. *Presented by the Assocn.*

HILL (H. A.) 711 : 34
* The Town and Country Planning Act, 1944. (Reprinted from Butterworth's Emergency legislation service (annotated). [Law as at Mar. 1, 1945.]
9½″. xii + 131 pp.
Lond. : Butterworth. 1945. 10s. 6d. R. & P. (2)

Inf. file 711 : 34 folder

MINISTRY OF TOWN AND COUNTRY PLANNING
Town and country planning, England and Wales. The T— & C— P— Amendment Regulations, 1945, *&c.* (Statutory Rules and Orders, 1945 No. 661.)
leaflet. 9¾″. Lond. : H.M.S.O. 1945. 1d. R.

LORD CHANCELLOR Inf. file 711 : 34+711 (42) [72.08 : 333
Land, acquisition of, England. The H— of L— (Owner-Occupier) Regulations, 1945, *&c.* (Statutory Rules & Orders, 1945 No. 759/L.12.)
leaflet. 9¾″. Lond. : H.M.S.O. 1945. 1d. *Presented.*

SMITH-SAVILLE (J. R.) 711 : 34
Planning Acts, 1943-5, and compensation for acquisition of land *&c.*
8½″. viii + 244 pp. Lond. : Estates Gazette. [1945.] 16s. 6d. R.
T. & C.P. Act, 1944 ; T. & C.P. (Interim Devt.) Act, 1943 ; Licensing Planning (Temporary Provisions) Act, 1945.

Inf. file 711 [72.08 : 347.234.1

MINISTRY OF TOWN & COUNTRY PLANNING
Town and country planning, England and Wales. Compulsory purchase. The T— and C— P— Act, 1944, C— P— (Contemporaneous Procedure) Regulations, 1945, *&c.* (Statutory Rules & Orders, 1945, No. 1035.)
leaflet. 9¾″. Lond. : H.M.S.O. 1945. 1d. R.
Town and Country Planning Act, 1944. Compulsory Purchase (Contemporaneous Procedure) Regulations, 1945. (Circular No. 15.)
leaflet. 9¾″. Lond. : H.M.S.O. 1945. 1d. R.

Inf. file 711.038 + 39 " 313 "

REVERE COPPER AND BRASS *Incorporated, New York*
Preview of a new way of life. [By R. E. Alexander.]
9″. 13 pp. [New York. c. 1944.] *Presented.*

PHASES OF DEVELOPMENT

Inf. file 711.111.5 : 34

MINISTRY OF TOWN & COUNTRY PLANNING
Town and country planning, England and Wales. Particulars and forms of orders and notices. The T— and C— P— Act, 1944 (P— and Form of Orders and Notices) Regulations, 1945, *&c.* (Statutory Rules & Orders 1945, No. 1036.)
9¾″. 22 pp. Lond. : H.M.S.O. 1945. 6d. R.
Town and Country Planning Act, 1944. Particulars and Form of Orders and Notices Regulations, 1945. (Circular No. 16.)
leaflet. 8½″. Lond. : H.M.S.O. 1945. 1d. R.

REGIONAL PLANNING

HADFIELD (C. N.) 711.3—112 (42.89) + 711.3—162 (42.89)
Island survey. A review of existing conditions together with an outline of suggested planning proposals in the Isle of Man.
9¾″. 63 pp. + pls. + 2 folding maps. text illus. Isle of Man : I. of M. Examiner. 1944. 5s.
Presented by Inr. Arch. S. Gruszewicz.

CARTER (E. J.) *and* GOLDFINGER (ERNO) 711.3—162 (42.1)
* The County of London plan explained by *&c.* (Penguin Books.)
ob. 7″ × 8¾″. 80 pp. + folding map. text illus.
West Drayton : Penguin Bks. 1945. 3s. 6d.
Presented by Mr. Edward Carter [A.], joint author (3).

LONDON COUNTY COUNCIL Inf. file 711.3—162 (42.1)
County of London plan. Reports to be submitted . . . 194[illegible]
12″. 9 pp. Lond. 194[illegible]. R.

MUMFORD (LEWIS) 711.3—162 (42.1)
The Plan of London county. (Rebuilding Britain series, No. 2.)
8½″. 40 pp. Lond. : Faber & Faber. 1945. 1s. 6d. R.

ABERCROMBIE (PATRICK) 711.3—162 (42.1 —192
Greater London plan 1944. . . . A report prepared on behalf of the Standing Conference on London Regional Planning at the request of the Minister of Town and Country Planning.
[Final ed.] x + 221 pp. + 4 (A—D) + (27) pls. (some backed) + 7 + (3) folding pls. + var. pls. (phots.) + 2 folding pls. in pocket.
Lond. : H.M.S.O. 1945. £1 5s. R. & P. (4)

711.3—162 (42.72) + 711.4—162 (42.72 M)

MANCHESTER AND DISTRICT REGIONAL PLANNING COMMITTEE
Report on the tentative regional planning proposals. By R. Nicholas . . . in collaboration with the members of the Surveyors' Sub-Committee *&c.*
12″ × 9½″. 126 pp. + 28 pls. (backed).
Norwich & Lond. : Jarrold. 1945. R.

DRUMMOND (JOHN) 711.323 : 63
Charter for the soil.
8″. 219 pp. + (viii) pls. (backed).
Lond. : Faber & Faber. 1944. 10s. 6d. R.

TOWN PLANNING, RE-PLANNING

MUMFORD (LEWIS) 711.4 : 3
* City development. Studies in disintegration and renewal.
8″. (vii) + 248 pp. New York : Harcourt, Brace. 1945. ($2.00.)
Presented by Harvard University, & R.

711.4—162 (41.1 G)

GLASGOW, *city* : HIGHWAYS & PLANNING COMMITTEE
* First planning report to the . . . Committee, *&c.* By Robert Bruce.
text, 10½″ × 8″. 120 pp. + endpapers.
Folio of maps, plans and drawings accompanying the First *&c., cover title.* 15″. 12 pls. + endpapers.
[Glasgow.] 1945.
Presented by the Corporation, & P.

711.4—162 (42.12)

LONDON, *Corporation of the City of* : IMPROVEMENTS AND TOWN PLANNING COMMITTEE
* Report [of] Improvements and Town Planning Committee relative to post-war reconstruction in the City. (Report *&c.*)
* [Published ed.] 13¼″. (ii + iii) + vi + 32 + xxxiv pp. + (v, incl. front., + i) pls. + 6 + (i) pls. (persps.) + v + iv plans + 5 + iii plans (' drgs.'). Lond. : Batsford, for Corpn. 1944 [1945]. 10s. 6d. P. (2)
for Loan Library.

711.4—163 arch file

ROYAL FINE ART COMMISSION 711.4—162 (42.12)
Observations on the City of London's report on post-war reconstruction. [Made Dec. 1944.]
9¾″. 11 pp. Lond. : H.M.S.O. 1945. 2d. *Presented* (2).

711.4—162 (42.19 B) (064) + 728.1 (42.19 B + C) (064)

BRENTFORD AND CHISWICK, *borough* : HOUSING WEEK SUB-COMMITTEE *and* BRENTFORD REDEVELOPMENT SCHEME SUB-COMMITTEE
Brentford & Chiswick housing week. Souvenir programme, *cover title.* (House and Home Exhibition, Chiswick, . . . 1945.) (*Including* Brentford redevelopment, a scheme by H. V. Lobb . . *by* A. Chitty.)
ob. 7″ × 9¾″. 12 pp. text illus. [Chiswick.] 1945. 6d.
Presented by Mr. H. Vicars Lobb [F.]

711.4—162 (42.31 Sw)

SWINDON *borough* : POST WAR PLANNING SUB COMMITTEE
Planning for Swindon. Survey and report by W. R. Davidge . . . and report prepared by the . . . Sub Committee as approved *&c.*
13¼″. 69 pp. + front. + vii maps in pocket. text illus.
Swindon. [1945.]
Presented by the Borough Council.

NORWICH *city* 711.4—162 (42.61 N)
*City of Norwich plan. Prepared for the Council by C. H. James, . . . and S. Rowland Pierce, . . . consultants, and H. C. Rowley, . . . city engineer. *&c.*
12″ × 9½″. 135 pp. incl. pls. & 1 folding map + map in pocket.
Norwich : the Corpn. 1945. 7s. 6d. R. *and presented.*

MIDDLESBROUGH *borough* Inf. file 711.4—162 (42.74 M)
Address to Council by Town Planning Consultant [Max Lock] . . . [19]45. *With* Appendix, The town centre—details, *separately paged, and slip,* Corrections *&c.*
2 dupl. typescripts. 13″. 1945. *Presented by the Consultant [A.]*

SHEFFIELD: TOWN PLANNING COMMITTEE 711.4—162 (42.74 S)
Sheffield replanned. A report, . . . setting out the problems in re-planning the city and the proposals &c.
11″. 74 pp. + pls. [Sheffield. 1945.] 5s. R.

BERNOULLI (HANS) 711.4—163
Die Organische erneuerung unserer städte [organic development of our cities]. Ein vorschlag &c.
9″. 72 pp. text illus. Basel : Wepf. 1942.
Presented through the British Press Attaché, Berne.
Inf. file 711.4—163 + 711.55

REVERE COPPER AND BRASS *Incorporated, New York*
Your children could romp here while you shop. [Town re-planning, esp. shopping centres. By George Nelson.]
9″. 11 pp. [New York. c. 1944.] *Presented.*

DAVEY (REGINALD) 711.4—163 (42.12 + 42.13)
A plan for London City. [*Also* A site plan for Westminster, *inserted.*]
9¾″. 22 pp. incl. folding front. + insert, iv pp.
Nutley, Sussex : Forest Press. 1944. 6s. 6d. R.
Inf. file 711.4—163 (42.12/.15) : 712.21

TOWER HILL IMPROVEMENT TRUST, *London*
Tower Hill re-planned. Incorporating the report of Technical Sub-Committee &c.
9¾″. 12 pp. text illus. Lond. : the Trust, 18 Byward Street, E.C.3. 1945.
Presented by the Trust.

"PHILADELPHIA," *journal* 711.4—163 (73 Ph)
[Special issue :] Planning future Philadelphia. (xxxi, No. 11. Nov.)
11¾″. Philad. 1944. *Presented.*

WHISTON *rural district* 711.417 (42.72 H)
Design for the new community town of Halewood, near Liverpool. [By] Watson Garbutt, . . . planning officer &c.
8¼″. 36 pp. + 4 maps & pl., 2 folding. [Whiston. 1945.] R.
711.437—162 (41.1 K)

FIFE *County Council*: REGIONAL PLANNING COMMITTEE
Report on the planning of Kennoway village. By Maurice E. Taylor.
dupl. typescript (printed cover) and map, *hand-col'd.* 12¾″. 1945.
Presented by the Author [*A.*].

BOARD OF TRADE Inf. file 711.454 (42) : 34
Emergency powers (defence). Location of industry (restriction). The L— of I— (R—) Order, 1945, &c. (Statutory Rules & Orders, 1945 No. 671.)
leaflet. 9¾″. Lond. : H.M.S.O. 1945. 1d. (2).
Replacing L— of I— (R—) Order, 1942, not in Library.

GREAT BRITAIN: PARLIAMENT—ACTS Inf. file 711.454 : 34
Distribution of Industry Act, 1945. (8 & 9 Geo. 6 ch. 36.)
9¾″. 16 pp. Lond. : H.M.S.O. 1945. 3d. P.

ZONES, INCLUDING RESIDENTIAL AREAS

Inf. file 711.521.2 : 711.3 (42.74 S)
COUNCIL FOR THE PRESERVATION OF RURAL ENGLAND: SHEFFIELD & PEAK DISTRICT BRANCH
Sheffield's green belt.
9½″ × 7½″. 15 pp. text illus. [Sheffield.] 1945. 1s.
Presented by the C.P.R.E.

MINISTRY OF WORKS: LIBRARY Inf. file 711.573 + 727.3
Bibliographies :
No. 2. Some references to layout of university buildings [and 'u. cities' or centres].
leaflet. dupl. typescript. 8¾″ × 7″. 1945. *Presented by the Library.*

[REVERE COPPER AND BRASS *Incorporated, New York*] 711.58
You and your neighborhood. A primer for neighborhood planning. By Oscar Stonorov and Louis I. Kahn.
ob. 8½″ × 11″. unpaged. (94) pp. incl. pls. [New York. 1944.] *Presented.*

ROADS, TRANSPORT

(series) 69 (494)
shelved 711.7 : 625.74

SWITZERLAND: DELEGIERTE FUR ARBEITSBESCHAFFUNG
Schriftenreihe zur frage der arbeitsbeschaffung [executed works] :
Bautechnische reihe [series] :
Nr. 8. Bauen in kriegszeiten. Strassenbau [road-making]. [By] A. Sutter and E. Schaub.
11¾″. 54 pp. text illus. Zürich : Polygraphischer. [1942.]
Presented through the British Press Attaché, Berne.

U.S.: CONGRESS 711.713 (73) : 711.2
Interregional highways. Message from the President . . . transmitting a report of The National Interregional Highway Committee, outlining . . . a national system &c. (78th Congress, 2nd session. House document No. 379.)
8¾″. xi + 184 pp. + xiv pls. text diags. + folding pl.
Washington : Govt. Printing Off. 1944 :—
[British reprint.] (Cement and Concrete Assn.) replica. [1945.]

OLDER WORKS

Mr. H. A. N. Brockman [*L.*] (an early work).
Mr. John H. Harvey (index to a work).
Mr. A. B. Hayward [*L.*] (3, in 1944).
Mr. B. A. J. W. Lewis [*A.*] (3).
Mr. Frederick McManus [*F.*].
Merseyside Civic Society (*second copy of* Report).
Mr. Rees Phillips [*F.*] (*Alfred Saxon Snell & Phillips*) (3, plus 4 vols. of bound pamphlets).
"*Sculptured Memorials*," *Memorials & Sculpture Centre* (Mr. C. B. Radnor, Secy.).
Transferred from Prisoners of War Book Scheme, (*further vols*, 19, including 18 to loan, in addition to those in List).

PURCHASED :
Album of pamphlets, MSS., drawings, &c., on Westminster Bridge, 1735-36 ; &c.

Correspondence

DIGEST OF WAR-TIME LEGISLATION

1 Gray's Inn Square,
W.C.1.
15.12.45.

The Editor, THE JOURNAL, R.I.B.A.

DEAR SIR,—In the November issue of the JOURNAL Mr. Norman Searle referred in very kindly terms to the Digest of War-time Legislation which I prepared. He also pointed out the many difficulties which confront architects in town planning matters. Amendments of the War Damage Act are required and are being pressed on the Government, not the least important being what is called a "portable" cost of works payment, i.e., rebuilding war damaged premises on a wholly different site.

Mr. Searle raises one point under Compensation which can be referred to without in any way interpreting the law. Under the General Interim Development Order 1945 buildings of Classes 3 and 4 can be dealt with without an application being made, provided the limitations relating to these classes are complied with. The interim development authority may, however, with the consent of the Minister of Town and Country Planning, direct that development in these classes should not be undertaken without an application for permission being made, if they are satisfied that the proposed development in the area, or special circumstances affecting the area, would be prejudiced. The Corporation of the City of London have recently made such a Direction, and work to buildings of Classes 3 and 4 which will exceed £300 must be the subject of an application under the General Interim Development Order.

Yours faithfully,
CHARLES WOODWARD [*A.*]

DRY ROT

23 Whitehall Gardens,
Acton Hill, W.3.
12.11.45.

To the Editor, JOURNAL R.I.B.A.

DEAR SIR,—On Sunday, 11 November, there was a talk on the wireless on Science : a discussion between the announcer and a builder on the cause of dry rot. Several reasons were given for the start and spreading of dry rot, but one cause was not mentioned which occurred in a newly-erected large house on the South coast with a Norfolk reed thatch roof in less than 12 months after erection and occupation.

The floor joist flooring and the parquet covering all become affected with dry rot. The cause of the rapid growth of the fungus was that after the thatching was completed, the loose ends were pulled off and allowed to fall through the joists on to the concrete floor below. In course of time, these loose ends of thatch produced dry rot under the flooring. They should, of course, have been swept up before the flooring was completed and not allowed to decompose on the wet concrete underneath the floor boards.

Perhaps you will think it is worth while to insert in the JOURNAL something of this statement as a warning to brother architects.

Yours faithfully,
F. R. GOULD WILLS [*Retd. F.*].

Obituary

MOWBRAY ASTON GREEN [*F.*], R.W.A.

The passing of Mowbray Green, the doyen of Bath architects, at the age of 80, has deprived that city of a most kindly and public-spirited personality and also of one who was its most distinguished authority on the architecture of the Georgian period.

Mr. Green was not a native of Bath but came there in 1890 to carry on the practice of J. Elkington Gill.

He was born in Surrey and completed his education at the Architectural Association School and at University College, London, being subsequently articled to Alfred Goodridge.

He was a man of many and wide interests, not the least being a life-long devotion to architectural education, and his long and valued connection with the Royal West of England Academy, later to become the Bristol School of Architecture, was of the greatest help to many of the younger generation in the profession.

As the author of *The Eighteenth Century Architecture of Bath* published in 1904, the standard work on the Georgian City of Bath, it was only natural that he should have been asked to compile the schedule of buildings in the city which were to be preserved under the Bath Act. He was president of the Bath Preservation Trust.

His practice was large and varied, covering a wide field. Churches, country houses, schools and town residences all came within his scope. But his untiring energy needed further outlets ; he was interested in estate development and more particularly in arbitration and valuation and all the work ancillary to his status of surveyor on which he was a recognised authority.

Perhaps the achievement in which he took most pride was the restoration of the historic Bath Assembly Rooms, which was completed just before this war. Those who saw the rooms restored to their original glory, for an all too brief period, will never forget their loveliness.

But as their restoration had been his pride, so their destruction by enemy action in 1942 was the bitterest tragedy of his professional life. He had surveyed the damage, however, and, had he been spared, would have rejoiced, should they ever be rebuilt. Other buildings in his charge were Prior Park, the Royal School, Lansdown, and Bath Abbey.

His wide experience and knowledge were well known. He was a man of great natural charm and courteous to all who met him or with whom he had dealings. His tall and erect figure was familiar to many and almost till the end he retained his amazing energy and youthful appearance. He will be much missed by all who knew him.

Notes

Devon and Cornwall Architectural Society

It is regretted that owing to serious illness Mr. Oliver Parker [*L.*] has had to relinquish the Hon. Secretaryship of the Society after having served in that position since 1938. Mr. K. Cameron Beaumont [*A.*], who is the Hon. Secretary of the Plymouth Branch, has been elected to fill the vacancy, and his address is 78, Torr Lane, Hartley, Plymouth.

Mr. G. A. C. Hayman [*A.*], who was the Hon. Secretary of the Exeter Branch, has now taken up an appointment at Cambridge, and Mr. John Bennett [*F.*], late City Architect of Exeter and a former President of the Society, has kindly consented to act as Hon. Secretary of this Branch. Mr. Bennett's address is 36, Old Tiverton Road, Exeter.

The Northern Architectural Association

The first post-war meeting of the Northern Architectural Association was held recently at King's College. The President, Mr. Stanley Milburn, M.B.E., M.C., [*F.*], was in the chair, and in his address to the members pointed out the difficulties of the immediate future and how best the profession can meet them. He expressed the hope that in the important matter of architectural education and in consideration of those who served in the Forces and are returning and in memory of those who have made the supreme sacrifice, the Northern Architectural Association will establish a Victory Scholarship at the School of Architecture, King's College.

Later Lord Eustace Percy gave the inaugural address of the series arranged for the session and delighted the large audience by giving his ideas, as a layman, of what should be the aims of the School of Town Planning at King's College.

Intermediate Examination, November 1945

The R.I.B.A. Intermediate Examination was held in London, Manchester, Newcastle, Edinburgh and Belfast from 9 to 15 November 1945.

Of the 137 candidates examined, 50 passed and 87 were relegated. The successful candidates are as follows :—

Baldwin, Kenneth.
Barry, Robin L.
Bolton, Gerald V. (Subject to approval of remaining Testimonies of Study).
Busbridge, Pauline (Miss).
Clayton, John C.
Crane, Gerald E.
Cunnington, Pamela M. (Miss).
Deacon, Desmond R.
Ellis, Eileen M. (Miss).
Evans, John D.
Fidler, Donald M.
Fulbeck, John C. W.
Gatoff, Maurice.
Gear, Leslie A.
Gibson, George K.
Goodman, Peter S.
Gregory, Patrick B.
Guaschi, Eric J.
Hall, Noel, B. J.
Harrington, Frank H.
Heppell, Stuart A. B.
Herring, Mary (Miss).
Hill, Perry M.
Holland, Thomas N.
Hughes, Kenneth S.
Hutchings, Lois M. (Miss).
Jackson, Brian W.
Jacob, Christopher H.
Jones, Alan C.
Kenmuir, Herbert E.
Leaker, Dudley R. (Subject to approval of remaining Testimonies of Study.)
Lyons, Richard E. P.
Millin, Norman C.
Mills, Denis L.
Mitchell, James H.
Moorby, Richard P.
Petter, Ernest T.
Porter, William D.
Reid, Donald A.
Robinson, Edmund J.
Robjohns, Arnold F.
Sawyer, Richard L.
Slater, Dennis C.
Smart, John H.
Sowerby, John G. (Subject to approval of remaining Testimonies of Study.)
Stafford, Leonard J. A.
Stephenson, Robert.
Stickings, Joyce D. (Miss).
Tischler, Hans P.
Tompkins, Jeanne M. (Miss). (Subject to approval of remaining Testimonies of Study.)

The R.I.B.A. Diploma in Town Planning

At the Examination held in July, 1945, the following were successful and have been awarded the R.I.B.A. Diploma in Town Planning :—

Clark Fyfe
William Thomas Glare
Peter S. Leask
John Stevenson
Alfred E. Williams

R.I.B.A. Examination for the Office of Building Surveyor under Local Authorities

At the R.I.B.A. Examination for the Office of Building Surveyor under Local Authorities, held on 2, 3, and 4 May 1945, six candidates presented themselves and the following were successful :—

Mr. Percy Fletcher
Mr. Robert D. Jee
Mr. Arthur Wright

Membership Lists

ELECTION : 11 DECEMBER, 1945

The following candidates for membership were elected on 11 December 1945.

AS HON. CORRESPONDING MEMBER (1)

Edmunds : James Richards, Jun., B.Sc. (Arch.). Honorary Society of Sigma Xi. President of the American Institute of Architects. Baltimore, Maryland, U.S.A.

AS FELLOWS (12)

Burrington : Thomas [*A.* 1930], Swindon.
Evans : Leslie Maurice [*A.* 1931], Loughborough.
Fleming : Owen [*A.* 1891].
Harris : Robert Oliver [*A.* 1930], Taunton.

McGRATH : RAYMOND, B.Arch. (Sydney), [*A.* 1928], Dublin.
SHAW : CHARLES CECIL, B.Arch. (Liverpool) [*A.* 1925].
SIMPSON : JAMES ROUNTHWAITE MOORE [*A.* 1925].

And the following Licentiates who have passed the qualifying Examination :—

BRITTON : EDWARD.
LASDUN : DENYS LOUIS, M.B.E.

And the following Licentiates who are qualified under Section IV, Clause 4 (*c*) (ii) of the Supplemental Charter of 1925 :—

MAXFIELD : WILLIAM RAWSON.
PERKINS : JOSEPH, Northampton.
PERRY : RICHARD THOMAS (Lieut.-Col.), V.D., Winterbourne, Glos.

AS ASSOCIATES (18)

BAKER : LAURENCE WILFRED.
BERBIERS : JOHN LOUIS, Southport.
BOYLE : WILLIAM VINCENT, B.Arch., Dublin.
CANTWELL : WILFRID JOHN, B.Arch., Dublin.
CRITCHLOW : ARTHUR, Rochdale.
DELANY : PATRICK MICHAEL (B.Arch.N.U.I.), Dublin.
HILTON : FREDERICK HUGH, B.Arch., Dublin.
HOUSTON : TREVOR ANTHONY, Belfast.
HOWGRAVE-GRAHAM : HAMILTON STUART.
JACKSON : JOHN PHILIP, Leigh, Lancs.
JOHNSON : EDWARD AUSTEN, Dip.Arch. (Leeds), Huddersfield.
JONES : RONALD NORMAN, Dip.Arch. (Liverpool), Dip.C.D. (Liverpool), Birkenhead.
KEMP : JOHN ARTHUR, Dip.Arch. (Leeds), Batley, Yorks.
LOYD : JOHN CLULOW.
McWILLIAM : ALAN, Edinburgh.
PEATFIELD : FRANK LEO, Bedford.
REED : FREDERICK DAVID LLOYD.
WATT : GEORGE MILNE (Major), M.B.E., Poole.

AS LICENTIATES (14)

COLLINS : LESLIE PEARSON.
FERGUSON : ROBERT WILLIAM.
FLETCHER : JAMES, Preston.
GIBSON : GEORGE, Paisley.
HOUSTON : JAMES SYMINGTON, Glasgow.
KIRBY : BRIAN FRANK, A.M.T.P.I.
KITE : JAMES LONGDEN, Andover.
MITCHELL : JAMES MELDRUM, Arbroath.
MOFFITT : JOHN, Newcastle.
MORRIS : GWYN HENRY, Coventry.
PEARCE : CHARLES WILLIAM.
SURMAN : JOHN MAXWELL, Oxford.
SWANN : JOHN HENRY, Belfast.
TRIGGS : WALTER JOHN, P.A.S.I.

ELECTION: 12 FEBRUARY 1946

An election of candidates for membership will take place on 12 February 1946. The names and addresses of the candidates, with the names of their proposers, found by the Council to be eligible and qualified in accordance with the Charter and Bye-laws, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Monday, 11 February 1946.

The names following the applicant's address are those of his proposers.

AS FELLOWS (7)

CRANE : EDWARD RAY, D.S.C. [*A.* 1935], 31 Prince of Wales Road, Norwich ; 402 Unthank Road, Norwich. E. W. B. Scott, A. G. Berry and T. G. Scott.

DRURY : HENRY MYLES REILLY [*A.* 1928], The Church House, The Close, Exeter, Devon ; 5 Victoria Park Road, Exeter. L. T. Moore, W. G. Allen and J. Challice.

DUNHAM : PETER BROWNING [*A.* 1933], 14 The Hill, Witney, Oxon ; Oldhill Wood, Studham, Dunstable, Beds. Prof. A. E. Richardson, Prof. H. O. Corfiato and W. R. Steel.

LANCASHIRE : JOHN EDWIN [*A.* 1927], Sainsbury's Buildings, 54 Campo Lane, Sheffield, 1 ; 11 Oriel Road, Sheffield, 10. H. B. S. Gibbs, J. M. Jenkinson and Stephen Welsh.

WYNESS : JAMES FENTON, Dip.Arch., F.S.A.Scot. [*A.* 1927], 45 Salisbury Terrace, Aberdeen. J. A. O. Allan, John Wittet and J. B. Nicol.

And the following Licentiates who have passed the qualifying Examination :—

THORPE : ALBERT NEWTON, Architect's Department, Engineer's Office, L.N.E.R., York ; 66 Severus Avenue, Acomb, York. Kenneth Ward, C. W. C. Needham and J. S. Syme.

WINBOURNE : HYMAN, c/o Messrs. F. W. Woolworth & Co., Ltd., 1-5 New Bond Street, W.1 ; 50 Sloane Street, S.W.1. G. G. Winbourne, E. M. Joseph and E. G. W. Souster.

AS ASSOCIATES (7)

The name of a school or schools after a candidate's name indicates the passing of a recognised course.

BRITTLEBANK : ERIC [Final], 19 Towngate, Northowram, Halifax. Norman Culley, Geo. Crossley and J. F. Walsh.

FLETT : GEORGE (Edin. Coll. of Art), 7 New Street, Findochty, Banffshire. Leslie Grahame-Thomson, W. I. Thomson and E. F. Davies.

HALL : THOMAS DAVISON, Dip.Arch. (King's Coll. (Univ. of Durham), Newcastle-upon-Tyne). The Datcha, Allendale, Hexham, Northumberland. W. B. Edwards, Ronald Bradbury and S. W. Milburn.

McCULLOCH : JOHN EDGAR (Edin. Coll. of Art), c/o Mrs. Christie, 29 Lutton Place, Edinburgh, 8. Leslie Grahame-Thomson, J. A. Arnott and W. I. Thomson.

SCOTT : JOHN [Final], "Dunearn," Chaine Memorial Road, Larne, Northern Ireland. R. S. Wilshere, R. H. Gibson and Frank McArdle.

SYDNEY : PHILIP ALGERNON (Univ. of Liverpool), Elmcroft, Spital Road, Bromborough, Wirral, Cheshire. Prof. L. B. Budden, B. A. Miller and J. E. Marshall.

WILLIAMS : HUGH OWEN (The Tech. Coll., Cardiff), "Brookside," 49 Ty-draw Road, Roath Park, Cardiff. Lewis John, Sir Percy Thomas and T. A. Lloyd.

AS LICENTIATES (17)

BANFIELD : FRANCIS THEODORE, Assistant Borough Surveyor, Guildhall, Maidenhead ; 49 Courthouse Road North, Maidenhead, Berks. Frank Woods, F. E. Wapshott and applying for nomination by the Council under Bye-law 3 (*d*).

BROTHERTON : ALAN HARGREAVES, 39 Oxford Road, Manchester ; Whitehall, Brooklands, Manchester. H. T. Seward and applying for nomination by the Council under Bye-law 3 (*d*).

DRAKE : JACK WILLIAM, 12 Grimsdells Lane, Amersham, Bucks. Melville Seth-Ward, W. H. Ansell and W. J. Gomm.

ELLIS : ROBERT SOMERVILLE, Scottish Special Housing Association, Ltd., 11 Drumsheugh Gardens, Edinburgh ; 35 Craigleith Drive, Edinburgh, 4. A. A. Foote, E. J. MacRae and A. H. Mottram.

ELMER : JOSEPH HENRY, Engineer's Department, Town Hall, Hornsey, N.8 ; 41 Mountview Court, Green Lanes, N.8. H. W. Matthews, A. S. Ash and D. T. Wallis.

FOX : CECIL HENRY (Major, R.E.), formerly of 36 Ebury Street, S.W.1 ; 119 Church Drive, Kingsbury, N.W.9. A. E. Batzer, Norman Jones and P. Hickey.

GOLDSBROUGH : FRANCIS, 18 Bennett's Hill, Birmingham, 2 ; 38 Bloomfield Road, Moseley, Birmingham, 13. W. T. Benslyn, C. F. Martin and W. A. Harvey.

HIND : WILLIAM LIONEL, 13 Princes Square, Harrogate ; 22 Glebe Street, Stoke-on-Trent ; 51 Woodlands Avenue, Harrogate. Applying for nomination by the Council under Bye-law 3 (*d*).

LAMB : ANDREW JOHN (Major), 128 Moorside North, Fenham, Newcastle-on-Tyne, 4. G. H. Gray, Joshua Clayton and R. N. Mackellar.

LAMBERT : ERIC PERCY, 21 West Street, Bridport, Dorset ; Quoin, Park Road, Bridport. Applying for nomination by the Council under Bye-law 3 (*d*).

MAYSON : WILLIAM STANLEY, Engineer and Surveyor's Department, Washington U.D.C. ; "Mary's Lea," Village Lane, Washington, Co. Durham. The President and Hon. Sec. of the Northern A.A. under Bye-law 3 (*a*) and applying for nomination by the Council under Bye-law 3 (*d*).

PLUMTREE : HENRY SANDERSON, County Architect's Office, Shire Hall, Nottingham ; 124 Edward Road, West Bridgford, Notts. C. E. Howitt, E. W. Roberts and E. Frear.

POOK : FREDERICK JOHN, The Gate, Stroud Farm Road, Holyport, Berks. Robert Lutyens, Harold Greenwood and A. S. G. Butler.

TITLEY : PERCIVAL EDWARD, c/o Messrs. Parker & Allen, 1 St. Andrew Street, Plymouth ; 2 Fairview, Underwood Road, Plympton, South Devon. Geoffrey Owen, John Bennett and E. H. Ashburner.

WALKER : RONALD WILLIAM, 44A The Chine, Grange Park, N.21. W. E. Masters, P. W. Haine and G. W. Knight.

WHITE : FRANK SILVESTER (Lieut.-Col.), late Director of Public Works, Cyrenaica ; 190 Heanor Road, Ilkeston, Derbyshire. F. B. Nightingale and applying for nomination by the Council under Bye-law 3 (*d*).

YATES : CHARLES HENRY, 12 Saltergate, Chesterfield ; 39 High Street, New Whittington, Chesterfield. Clifford Bond and applying for nomination by the Council under Bye-law 3 (*d*).

ELECTION: 7 MAY, 1946

An election of candidates for membership will take place on 7 May 1946. The names and addresses of the overseas candidates, with the names of their proposers, are herewith published for the information of members. Notice of any objection or any other communication respecting them must be sent to the Secretary, R.I.B.A., not later than Saturday, 27 April 1946.

AS FELLOWS (3)

The names following the applicant's address are those of his proposers :—

HUGHES : (Mrs.) EUGENIE DOROTHY [*A.* 1932], P.O. Box 460, Nairobi, Kenya Colony. S. L. Blackburne, L. G. Jackson and P. Dangerfield.

MANSFIELD : JOHN LESLIE STEPHEN (Capt. R.A.E.), B.Arch. [*A.* 1929], c/o Messrs. Fowell & Mansfield, 70 King Street, Sydney, N.S.W. : 8 Chesterfield, 450 Edgecliff Road, Edgecliff, N.S.W. Prof. Leslie Wilkinson, B. J. Waterhouse and J. C. Fowell.

NARWEKAR : SHRIDHAR JAYARAM [*A.* 1931], Lalgir Chambers, Tamarind Lane, Fort, Bombay, India ; Girgaon, Bombay. S. S. Reuben, B. S. J. Aga and D. W. Ditchburn.

AS ASSOCIATES (4)

The name of a school or schools after a candidate's name indicates the passing of a recognised course.

BURGESS : ERIC LUTHER (F/Lt.), B.Arch. (McGill University, Montreal, Canada), 64 Harmer Avenue, Ottawa, Canada. P. E. Nobbs, H. L. Fetherstonhaugh and Robert Atkinson.

JACKSON : (Miss) JOAN MURIEL (passed a qualifying Exam. approved by the R.A.I.A.), 19 Berwick Street, Coogee, Sydney, N.S.W. Prof. A. S. Hook, Prof. Leslie Wilkinson and W. R. Richardson.

PYNOR : HENRY (passed a qualifying Exam. approved by the R.A.I.A.), Department of Architecture, Sydney Technical College, Ultimo, Sydney, N.S.W. Prof. Leslie Wilkinson, J. C. Fowell and Prof. A. S. Hook.

ROBERTSON : (Miss) GWENDOLYN HOWARD (passed a qualifying Exam. approved by the R.A.I.A.), 30 Broughton Road, Artarmon, N.S.W. Prof. Leslie Wilkinson, H. G. Turner and J. C. Fowell.

Competitions

COMPETITION FOR LAYOUT AND REPLANNING OF THE CRYSTAL PALACE

The Trustees of the Crystal Palace and the Council for the Encouragement of Music and the Arts (C.E.M.A.) invite architects and town-planners to submit designs for the layout of the new Crystal Palace and its surroundings.

Assessors : Prof. Sir Patrick Abercrombie [*F.*]
Dr. Charles Holden [*F.*]
Mr. Alister MacDonald [*F.*]
Sir Kenneth Clark, K.B.E.
Mr. Lewis Silkin, M.P.

Premiums : £2,000, £750, £500, and a further sum of £500 may be awarded at the discretion of the Assessors.

Last day for submitting designs : 6 April 1946.

COLOMBO CATHEDRAL COMPETITION

The Colombo New Cathedral Committee, in association with the Standing Committee of the Diocesan Council of the Church of Ceylon, invites architects who are qualified members of the Royal Institute of British Architects or allied bodies to submit in competition designs for the proposed Cathedral of The Holy Cross, together with Bishop's House, Divinity School, Diocesan Hall and Offices, in Colombo, on a site adjoining Buller's Road in that city. The competition is being organised by the Royal Society of Arts, London, on behalf of the Colombo New Cathedral Committee.

Assessor : Sir Giles Gilbert Scott, O.M., R.A. [*F.*].
Premiums : £500 ; £200 ; and £100.
Last day for submitting designs : 31 December 1946.
Last day for questions : 28 February 1946.

Conditions of the competition may be obtained on application to The Secretary, The Royal Society of Arts, 6 John Adam Street, Adelphi, London, W.C.2. Deposit £1.

WESTMINSTER: COMPETITION FOR WORKING-CLASS FLATS

The Westminster City Council invite architects to submit in competition designs for the layout of about 31 acres in Westminster, and for the design of flats to be erected thereon.

Assessor : Mr. Stanley C. Ramsey [*F.*].
Premiums : 700 guineas, 500 guineas, 300 guineas and 200 guineas.
Last day for submitting designs : 31 March 1946.

It is the intention of the Promoters to proceed forthwith with the erection of the buildings on one section of the area covering about 8 acres and subject to the Conditions of the Competition to employ for that purpose the author of the winning design at fees calculated in accordance with the R.I.B.A. scale of architects' fees for State-aided multi-storey flats.

Conditions of the competition may be obtained on application to Sir Parker Morris, LL.B., Town Clerk, Westminster City Hall, Charing Cross Road, W.C.2.

Deposit, 3 guineas.

Notices

INFORMAL MEETING
TUESDAY, 12 FEBRUARY 1946

An Informal General Meeting will be held on Tuesday, 12 February 1946, at 6 p.m., when Professor J. D. Bernal, F.R.S., will read a Paper on "The Organisation of Building Science Research."

ANNUAL SUBSCRIPTIONS

Members' subscriptions, Students' and Subscribers' contributions became due on 1 January 1946.

The amounts are as follows :—

Fellows	£5 5 0
Associates	£3 3 0
Licentiates	£3 3 0
Students	£1 1 0
Subscribers	£1 1 0

NOTE.—By a resolution of the Council dated 20 July 1931 the subscriptions of R.I.B.A. members in the transoceanic Dominions who are also members of Allied Societies in those Dominions are reduced to the following amounts as from 1 January 1932 :—

Fellows	£3 3 0
Associates	£2 2 0
Licentiates	£2 2 0

Members who are already registered under the Architects' Registration Act 1931 are reminded that the annual renewal fee of £1 became due on 1 January 1946, and should be forwarded DIRECT to the *Registrar, The Architects' Registration Council,* 68 Portland Place, W.1.

COMPOSITION OF SUBSCRIPTIONS FOR LIFE MEMBERSHIP

Fellows, Associates and Licentiates of the Royal Institute may become Life Members by compounding their respective annual subscriptions on the following basis :—

For a Fellow by a payment of £73 10s. (70 guineas).

For an Associate or Licentiate by a payment of £44 2s. (42 guineas), with a further payment of £29 8s. (28 guineas) on being admitted as a Fellow.

In the case of members in the transoceanic Dominions who are members of Allied Societies in those Dominions, the following basis will operate :—

For a Fellow by a payment of £52 10s. (50 guineas).

For an Associate or Licentiate by a payment of £31 10s. (30 guineas), with a further payment of £21 (20 guineas) on being admitted as a Fellow.

Provided always that in the case of a Fellow or Associate the above compositions are to be reduced by £1 1s. per annum for every completed year of membership of the Royal Institute after the first five years, and in the case of a Licentiate by £1 1s. per annum for every completed year of membership of the Royal Institute, with a minimum composition of £6 6s. in the case of Fellows and £4 4s. in the case of Associates and Licentiates.

ARCHITECTURAL COMPETITIONS
ASSESSORS' AWARDS

All architects who take part in architectural competitions are reminded by the Council of the R.I.B.A. that participation in a competition is a definite acceptance of the principle that the award of the assessor is final and binding upon themselves as well as upon the promoters, and that any competitor who feels that he has real ground for dissatisfaction with an assessor's award should communicate with the Secretary of the R.I.B.A.

Further, all architects, whether competitors or otherwise, are reminded that discussion or correspondence in the public or professional Press which tends to criticism or disparagement of an assessor or award cannot alter the final and binding effect of the award, but may prejudice architects and the whole competition system in the opinion of the public, and is, therefore, highly undesirable.

ASSOCIATES AND THE FELLOWSHIP

Associates who are eligible and desirous of transferring to the Fellowship are reminded that if they wish to take advantage of the next election they should send the necessary nomination forms to the Secretary R.I.B.A. as soon as possible.

R.I.B.A. DISTINCTION IN TOWN PLANNING

The R.I.B.A. Distinction in Town Planning is obtainable by Fellows, Associates (who are not less than 26 years of age) and Licenciates. The test by means of which this Distinction is awarded is conducted by special Examiners appointed by the Council of the R.I.B.A.

This award does not take the place of the R.I.B.A. Diploma in Town Planning, which is obtainable by Fellows, Associates and Licentiates of the R.I.B.A. without any minimum age limit.

The primary purpose of the Distinction is to satisfy a demand from senior architects to take a qualifying test in town planning suited to their age and existing attainments.

The Examiners will meet three times a year—in February, May and October. Applications should be submitted to the Secretary of the R.I.B.A. by 1 January, 1 April and 1 September annually.

Copies of the form of application containing the procedure, regulations, general scope of study and bibliography may be obtained free on application to the Secretary, R.I.B.A.

BUILDING SURVEYING EXAMINATION

The R.I.B.A. Examination qualifying for candidature as Building Surveyor under Local Authorities will be held at the R.I.B.A. on 1, 2 and 3 May 1946. Applications for admission to the examination must be received not later than 15 March 1946.

"A.B.S."
HOUSE-PURCHASE SCHEME
REVISED TERMS

Advances: Up to 80 per cent. of a reasonable valuation.

Interest: 4½ per cent. gross.

Repayment: By means of an Endowment Assurance term not exceeding 25 years.

No Survey or legal fees normally charged to the Borrower.

Particulars from: The Secretary, A.B.S. Insurance Department, 69 Portland Place, London, W.1. (Tel. WELbeck 5721).

Members' Column

APPOINTMENTS

Lieut.-Col. E. Allan Heppenstall, R.E. [*A.*], A.M.T.P.I., has been released from the Army to take up his appointment as Borough Architect, Macclesfield. He would be glad to receive trade catalogues, etc., particularly in relation to housing, at the Borough Architect's Office, 3 Jordengate, Macclesfield, Cheshire.

Mr. Frederick Hill [*A.*], A.M.T.P.I., has been appointed architect to the Redditch U.D.C. and would like to receive trade catalogues, etc., at the Council House, Redditch, Worcs.

Mr. A. F. Russell [*A.*], A.M.T.P.I., has been appointed Chief Assistant to the Wolverhampton and District Joint Planning Committee.

Mr. Denis Winston [*A.*] has resigned his position as Chief Architect to the Northern Ireland Ministry of Health and Local Government and accepted the post of Borough Architect of Southampton. Mr. Winston took up his new appointment on 1 December.

Mr. W. H. Henry [*L.*] has been released from military service and has been appointed County Architect for the County of Clackmannan. He will be pleased to receive trade catalogues addressed to the County Architect, Town Hall, Alloa.

PARTNERSHIPS AND NEW ADDRESSES

Mr. Percy Thomas [*F.*], President, announces that from 1 January 1946 he has taken into partnership his son, Norman Percy Thomas [*A.*], and that the firm is known as Percy Thomas & Son, 10 Cathedral Road, Cardiff. (Cardiff 1380).

Messrs. Clayton & Black [*F/F.*], of 10 Prince Albert Street, Brighton, 1, are opening a branch office at 9 and 10 Regent House, London Road, Portsmouth, as from 1 January 1946. Captain C. E. Patch will be in charge there.

Messrs. L. A. Culliford & Partners [*F/F.*] have now re-opened their London offices at 47 Essex Street, Strand, W.C.2. (Telephone Central 9061). For a while, however, they will be working from both this address and their temporary war-time address at 3 Manor Way, Beckenham.

Mr. E. L. Gale, M.C. [*F.*] and Mr. S. H. Fisk [*A.*] have taken into partnership Mr. R. G. Cox [*F.*] and Major E. A. Day [*A.*], late R.E. The firm will continue to practice as Clifford Tee & Gale at Moorgate Hall, E.C.2, and 39, Bennett's Hill, Birmingham.

Mr. W. Campbell-Jones [*F.*], F.S.I., having retired from practice in June 1945 and Mr. Owen Campbell-Jones having now been released from the Army, the firm of Campbell-Jones & Sons will continue to practice at Skinner's Hall, 9 Dowgate Hill, Cannon Street, E.C.4 (Tel. Central 7748), the partners being Mr. Owen Campbell-Jones and Mr. Mervyn Campbell-Jones [*F/F.*], F.F.S.I.

The practice carried on by Captain Ivor Shaw [*F.*] at 101 Alexandra Road, St. John's Wood, N.W.8, until 1940, is being re-opened in association with S. J. Lloyd [*A.*], now released from the R.A.F. The new address is Shaw & Lloyd, 74 Great Russell Street, Bloomsbury Square, W.C.1. (Mus. 9693). Trade catalogues invited.

Mr. David Stokes [*F.*] has taken into partnership Mr. Basil Smyth [*A.*] and the firm will practice as David Stokes & Basil Smyth at 5 Cochrane Street, N.W.8, until further notice.

Mr. W. S. Willan [*F.*] has taken Mr. D. A. Stewart [*A.*] into partnership. The practice will be carried on at Lime Trees, Nackington, Canterbury (Canterbury 2696) and at 116a, Sandgate Road, Folkestone (Folkestone 2134).

Mr. H. C. Boardman [*A.*] has rejoined the firm of Edw. Boardman & Son in partnership with Mr. F. H. Swindells [*F.*] and would like to receive trade catalogues, etc., at Old Bank of England Court, Queen Street, Norwich.

Mr. P. H. Braddock [*A.*], A.A.Dip. (Hons.), is now in practice at Orchard House, 14 Great Smith Street, Westminster, S.W.1, and will be glad to receive trade enquiries and circulars. Hours 10-12.30 a.m. only.

Mr. A. H. Down [*A.*] has commenced private practice and opened offices at Peloquin Chambers, 18 St. Augustine's Parade, Bristol, 1 (Bristol 26950), where he will be glad to receive trade catalogues, information sheets, etc., when available.

Major W. C. Ellis [*A.*] has taken over the practice of the late Mr. Douglas Crawford [*F.*]. The practice will be continued as Douglas Crawford & Ellis, Chartered Architects, with temporary offices at 28 Newlands Avenue, Bishop Auckland. Trade catalogues, information sheets, etc., will be welcomed.

Mr. Clifford S. Jaques [*A.*] on his pending release under Class B has taken over his late father's practice, which will be continued from 16 King Street, E.C.2 (Monarch 5896), under the title of Sydney Jaques & Son. The firm will be glad to receive trade catalogues.

Major H. C. Killender, R.E. [*A.*], F.S.I., A.M.T.P.I., and Captain S. C. Killender, M.C., R.E. [*L.*], entered into partnership on 1 September 1945 under the title of Killender & Killender, Imperial Chambers, 62 Dale Street, Liverpool, 2 (Liverpool Central 5233).

Mr. A. H. Neave [*A.*] has opened an office at 35 High Street, Battle, Sussex (Battle 51), and will be glad to receive trade catalogues, etc.

Mr. Clifford W. Shrimpton [*A.*] has opened an office at 5 Cardiff Road, Luton, Beds. (Luton 1863), and will welcome trade catalogues, etc.

Mr. W. Stephen Thomas [*A.*] has commenced practice at Metropolitan Bank Chambers, Commercial Street, Newport, Mon., and will be pleased to receive trade catalogues and information about new materials.

MR. PETER L. H. WAKEFIELD [*A.*] has been released from the Army to undertake housing work in the West of England in association with Mr. G. Blair Imrie [*F.*]. Pending his return to practice in Bristol his temporary office address is c/o G. Blair Imrie [*F.*], Teffont Magna, Wilts.

MR. RONALD J. WILSON [*A.*], A.R.A.I.A., is now practising at 191 Queen Street, Melbourne, C.1, Victoria, Australia, and would be pleased to receive merchants' and trade export catalogues, etc., particularly *re* housing and industrial work.

MR. CLIFFORD WORTHINGTON [*A.*] has commenced practice at 7 Clarendon Place, Maidstone, and will be pleased to receive trade catalogues.

MR. EDWARD W. GRATER [*L.*], upon relinquishing his position as Architect to the Metropolitan Railway Surplus Lands Company, Limited, has commenced in private practice at 42 Beech Avenue, Radlett, Herts. He will be pleased to receive trade catalogues, etc.

MR. H. HOPSON HILL [*L.*] having recently resumed full-time practice at Harpenden, Herts, is taking into partnership Mr. F. Stobart [*A.*] as from 1 January 1946. The name and address of the firm from that date will be Messrs. Hopson Hill & Stobart [*L.* and *A.*], 2 Leyton Green, Harpenden, Herts. Telephone: Harpenden 512.

MR. D. PLASKETT MARSHALL [*L.*] has moved to permanent offices at 59 Gordon Square, W.C.1 (Telephone Museum 7176-7177), and will be pleased to receive trade catalogues, etc. Representatives can be seen by appointment only.

MR. SIDNEY MORRIS [*L.*] and MR. HAROLD FRANK RILEY [*L.*] have entered into partnership and are practising under the title of Morris & Riley [*L./L.*], with offices at Orleans House, Edmund Street, Liverpool, 3, and will be glad to receive trade catalogues, etc.

MR. W. H. QUEMBY [*L.*] has opened an office at 228 Stockwell Road, London, S.W.9, where he will be glad to receive trade catalogues, etc.

MR. E. DONALD HAIGH [*A.*], A.M.T.P.I., and CAPTAIN J. C. DANCE, Quantity Surveyor, have commenced practice under the style of Haigh & Dance, Architects and Surveyors, 14 Finkle Street, Kendal, Westmorland.

MAJOR ARTHUR J. HAYES [*L.*] and MAJOR GORDON H. GRIFFITHS [*F.*], A.M.T.P.I., have formed a partnership practising at 98-100 Queen Street, Cardiff.

MEMBERS RELEASED FROM THE SERVICES, ETC.

The following members have notified the R.I.B.A. that they have been released from the Services and are resuming practice and would like to receive trade catalogues, information sheets and other data, etc.:

LIEUT.-COL. WALTER E. CROSS [*F.*], The Studio, Osterley Road, Isleworth, Middlesex. (Hounslow 1319).

MR. T. A. L. CONCANNON [*F.*] (Architect, P.W.D., Hong Kong), 94 Wildwood Road, N.W.11.

MAJOR A. J. DAVIDSON, R.E. [*F.*], 16-18 Athol Street, Douglas, Isle of Man.

MESSRS. W. R. F. FISHER, M.A. [*F.*] and W. V. TRUBSHAWE, M.A. [*F.*], 4 Ridgmount Street, W.C.1.

MR. E. PRICE LAVENDER [*F.*], "Royline," Lawn Close, Datchet, Bucks.

MAJOR LEONARD H. MCDERMOTT, T.D., R.A. [*F.*], Read & McDermott, 18 High Street, Maidstone, Kent. (Maidstone 2939).

MR. JOHN V. NISBET, M.A. [*F.*], The Portsmouth Brewery, Admiralty Road, Portsmouth.

MR. W. BARKER [*A.*] is resuming employment with the County Architect of Cheshire. 26 Ainsty Avenue, Dringhouses, York.

MAJOR G. C. BOXALL, M.C. [*A.*] (late R.A.), 42 Baldwin Road, Minster, Isle of Sheppey, Kent.

THE HON. LIONEL BRETT [*A.*], 33 Welbeck Street, London, W.1. (Welbeck 1681).

MR. A. B. CHATWIN [*A.*], Messrs. J. A. Chatwin & Son, York House, 38 Great Charles Street, Birmingham 3.

MR. R. V. CROWE [*A.*], c/o Messrs. Stanley Ramsey, Murray & White [*F/F.*], 32 Wigmore Street, London, W.1.

MR. L. DRIVER-JOWITT [*A.*], Savoy Building, Stanley Avenue, Salisbury, Southern Rhodesia.

MR. GERALD H. HARRISON [*A.*], 9 Frances Road, Windsor, Berks.

MR. IVAN S. HODGESS [*A.*], 10 Queen Anne Terrace, Plymouth.

MR. R. FORBES HUTCHISON [*A.*], 10 Glade Avenue, Ringwood Crescent, Wollaston Park, Nottingham.

MR. H. S. JARRATT [*A.*], 4 The Drive, Hove, Sussex.

CAPTAIN AUSTEN D. R. JENKINSON, R.E. [*A.*], Messrs. David B. Jenkinson & Son, Imperial Buildings, Rotherham.

CAPTAIN T. E. JONES [*A.*] (T. E. Jones & I. Ap Thomas), Midland Bank Chambers, Bangor, N. Wales.

LIEUT.-COMDR. J. PHILLIPS LOMAS [*A.*], Messrs. Lomas & Barrett, Martin's Bank Chambers, Victoria Street, Douglas, Isle of Man.

MESSRS. E. D. LYONS [*A.*] and LAWRENCE ISRAEL [*A.*], 72 New Cavendish Street, London, W.1.

MR. N. C. MACHIN [*A.*], Assistant Architect, Borough Engineer's Office, Council House, Smethwick.

MR. VINCENT ROTHER, B.Sc. [*A.*], 7 The Grove, Highgate, N.6.

MR. P. RUSSELL WALKER [*A.*], late Major R.E., Messrs. Adam Smith, Son & Walker, 35 New Broad Street, E.C.2.

COLONEL R. WOOD, T.D. [*A.*], 56 Rothwell Road, Gosforth, Newcastle-on-Tyne, 3.

MR. G. FORSYTH LAWSON [*L.*], 25a High Street, Banbury.

MR. ROBERT MCNAB [*L.*], 43 Watergate, Rothesay, Scotland.

MR. HARWOOD A. NASH [*L.*], 42 Chase Side, Southgate, N.14.

MAJOR D. OSPALAK, R.E. [*L.*], 37 Panton Street, Haymarket, S.W.1. (Tel. Whitehall 7261).

MAJOR W. A. PEGRUM, T.D. [*L.*], 22, Lansdowne Court, Brighton Road, Purley, Surrey.

MAJOR E. J. RICKETTS, R.E. [*L.*], 6 Victoria Terrace, Weymouth.

PRACTICES AND PARTNERSHIPS AVAILABLE AND WANTED

PARTNERSHIP required by Associate, Dip.Arch., ex-Major R.E., age 37, in active established practice, preferably in South of England but excluding London. Capital available.—Apply Box 188, c/o The Secretary, R.I.B.A.

ASSOCIATE, B.Arch., 1st Class Hons. (ex-Major R.E.), age 36, with good connection and own work in view, seeks provincial partnership. Seven years' general experience. Capital available.—Apply Box 189, c/o The Secretary, R.I.B.A.

ASSOCIATE (Scots.), aged 37, with excellent experience, desires working partnership with real prospects. Scotland or Midlands preferred.—Apply Box 190, c/o The Secretary, R.I.B.A.

ASSOCIATE, P.A.S.I. (Major R.E., recently released), age 35, seeks partnership and appointment with view to partnership. S. England preferred. Wide experience in London and W. Country. Capital available.—Apply Box 191, c/o The Secretary, R.I.B.A.

ASSOCIATE M.I.Struct.E. (Dip. Arch. Abdn.) recently returned from Far East seeks partnership in established practice. Southern counties for preference but not essential. Capital available.—Apply Box 193, c/o The Secretary, R.I.B.A.

ACCOMMODATION WANTED

ASSOCIATE, recently released, wishes to rent small office or share suite with another member. Regent's Park or Bloomsbury districts preferred.—Apply Box 192, c/o The Secretary, R.I.B.A.

ASSOCIATE, just released from the Forces, urgently requires office accommodation in London. Two rooms. Bedford Square area preferred.—Apply Box 194, c/o The Secretary, R.I.B.A.

WANTED AND FOR SALE

ASSOCIATE requires the following office equipment:—Filing cabinet (Roneo type), plan filing chests (double elephant, metal or wood), drawing benches, tee squares and boards (D.E. and Imperial), Dumpy level, etc.; also a copy of "Planning" (Architectural Press) and a set of volumes "Planned Information" (Tait & Lorne).—Apply Box 187, c/o The Secretary, R.I.B.A.

WANTED to purchase second-hand books as follows:—*The Story of Architecture*, by Godfrey, Parts I and II; *The Story of Architecture from earliest ages to the present day*, by P. Leslie Waterhouse, [F.]. Please reply to S. Hutton [*L.*], Lowlands, Skipton Road, Ilkley, Yorks.

WANTED, the following publications of "The Studio":—Special Spring number 1912, *The Village Homes of England*; "Studio," 1906, *Old English Country Cottages*; special Spring number 1913, *Old Dutch Houses*.—Apply to MR. HEDLEY A. MOBBS [*L.*], 18a High Street, Boston, Lincs.

FOR SALE. A number of drawing boards and tee squares, all double elephant size; also stools and trestles.—Write Rev. J. L. Biddulph Pinchard, St. John the Baptist Vicarage, 176 Holland Road, Kensington, W.14, or 'phone Park 5453.

PRACTICE FOR SALE

THE Practice of Chartered and Registered Architects and Surveyors carried on by Mr. S. Grundy, [*F.*], A.M.T.P.I., and the late Mr. J. A. Grundy, B.Arch. (Liverpool), [*A.*], under the name of J. W. Grundy & Son at Central Buildings, Ulverston, North Lancs. The business was established in 1870 and was continued until recently. The present sale is on account of the illness of the principal and the death on war service of his two sons. Excellent office premises specially built as architects' offices are available either to purchase or lease.—Further particulars from Hart Jackson & Sons, Solicitors, Ulverston, Lancs.